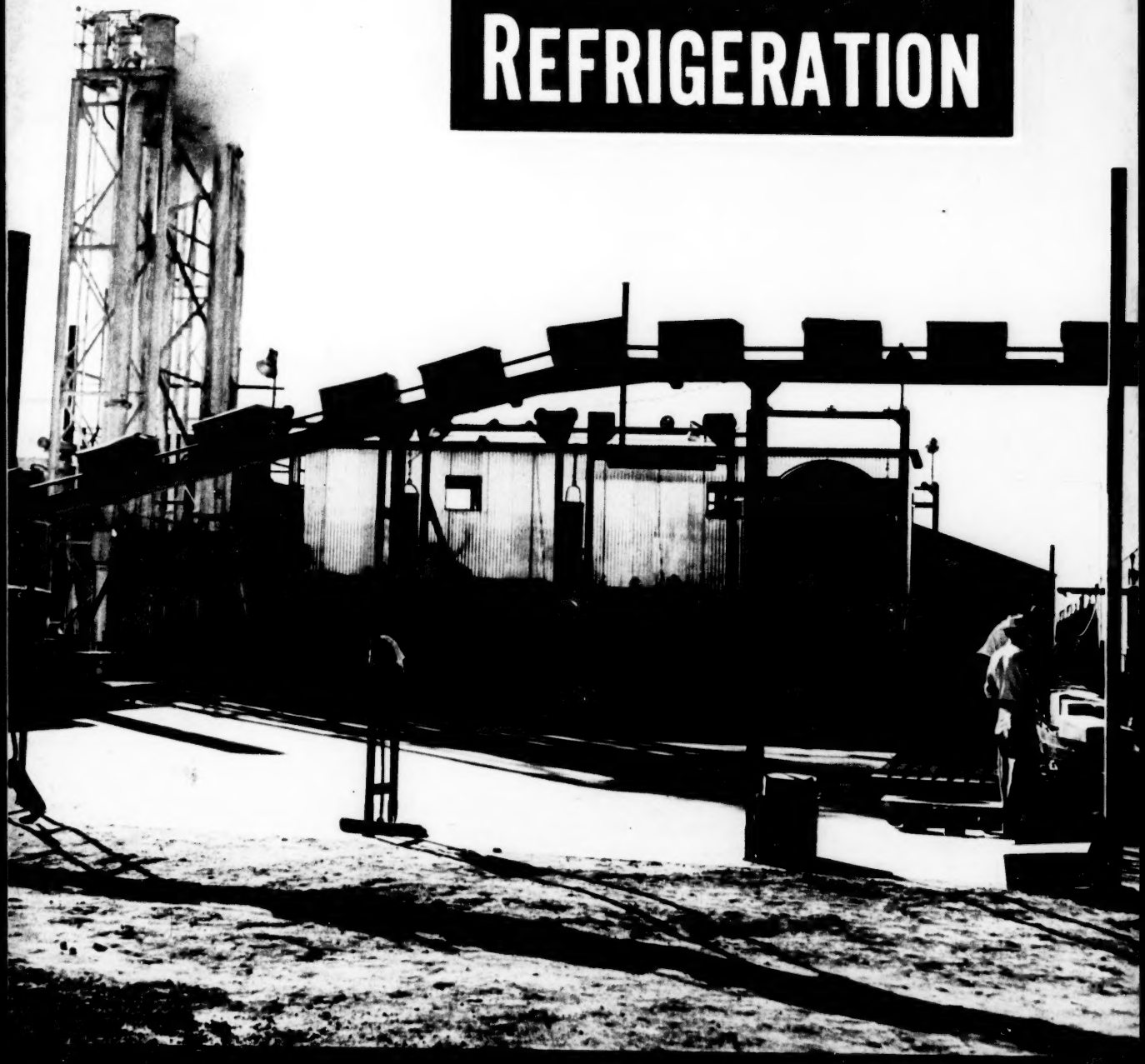
INDUSTRIAL REFRIGERATION



PROFITABLE COMPRESSOR INSTALLATIONS—

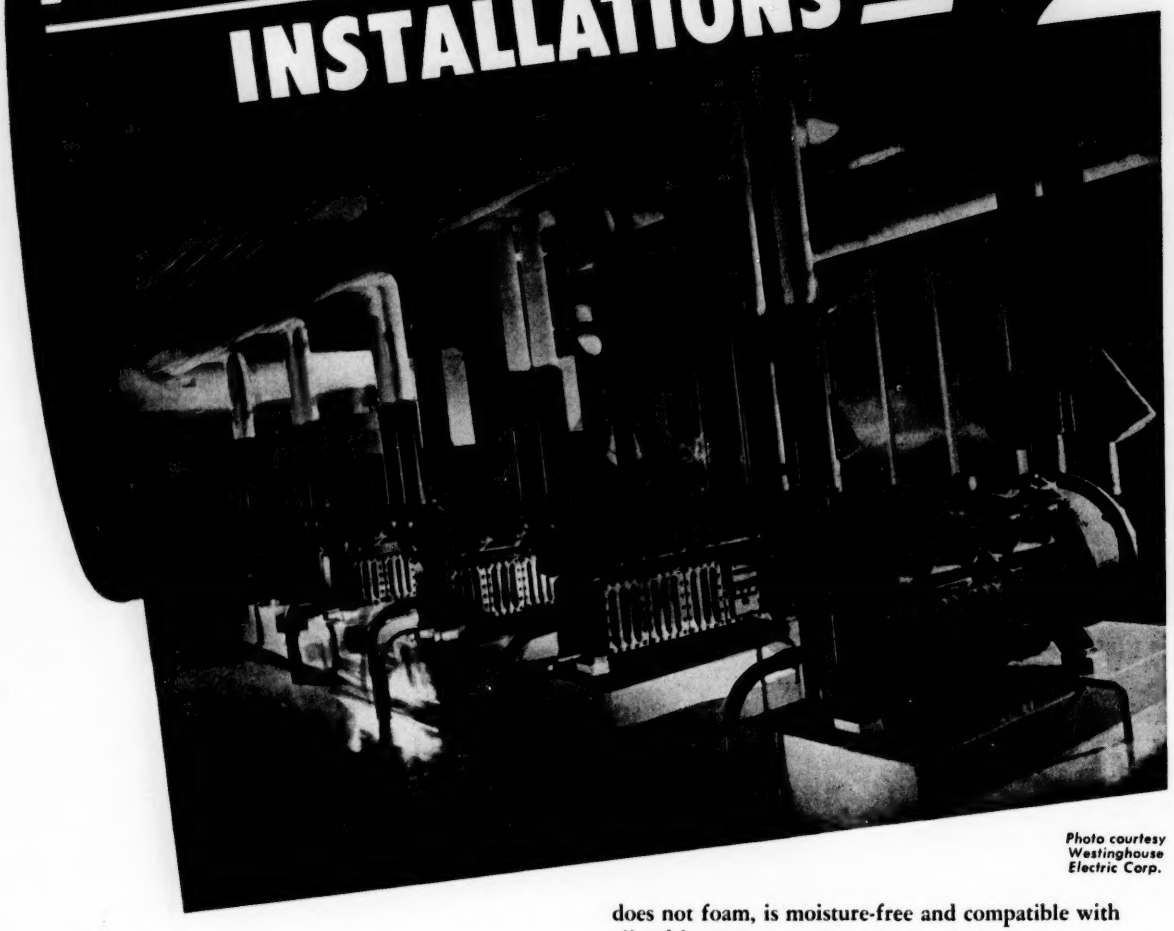


Photo courtesy Westinghouse Electric Corp.

PROFITABLE compressor installations are those that give consistently clean, trouble-free performance—the kind that recommends you to new business. To assure this, see that the compressors you install are lubricated with *Texaco Capella Oil (Waxfree)*.

Texaco Capella Oil (Waxfree) won't precipitate wax in systems—not even at temperatures down to minus 100° F. Haze and floc temperatures are exceptionally low. Stability and resistance to oxidation are exceptionally high. *Texaco Capella Oil (Waxfree)* does not foam, is moisture-free and compatible with all refrigerants.

There is a complete line of *Texaco Capella Oils (Waxfree)* to meet the requirements of all compressors and operating conditions. You can get them in 55-gallon and 5-gallon drums, 1-gallon cans, and the more widely used grades in 1-quart containers—all *refinery-sealed* to protect purity and quality.

A Texaco Lubrication Engineer will gladly help you select the proper ones. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Capella Oils (Waxfree)

FOR ALL REFRIGERATING AND AIR CONDITIONING COMPRESSORS

COOLER-FREEZER DOOR
- Modern streamlined job
- 100% "Douglas Fir"
- Sanitary hardware

X-52 PLYWOOD PANEL DOOR
- Plywood front and back
- Extra heavy-duty hardware
- Special type gaskets

- Maximum insulation fill
- Most possible rigidity
- Allows reversal of swing

LOW TEMPERATURE DOOR
- Entire metal-clad front
- Extra heavy-duty hardware
- Special type gaskets

SUPER FREEZER (OVER-LAP) DOOR
- Extra-heavy construction
- Extra-heavy duty gaskets
- Extra heavy-duty hardware

VESTIBULE DOOR
- Save time—labor
- Save refrigeration
- Large plant operation

TRACK DOOR
- For abattoirs
- Meat handling rails
- Banana rooms

AUTO-CLOSE DOOR
- For loading dock
- Intra-cooler doors
- Heavy trucking

DOUBLE DOOR
- For palletizing
- For carloading
- For elevator shafts

BUTCHER BOY REFRIGERATOR DOOR CO. • HARVARD, ILL.

when you think you need a

Pied Piper

Remember

RUBATEX *Insulation Hardboard*

*Makes More Cents**

Rot, vermin, termites, etc. — the "bugaboos" of refrigerated storage space — present no problem when Rubatex Insulation Hardboard is on the job. Rubatex is impervious to moisture so you need have no worry about it rotting out in a few years. Rubatex cannot breed or feed anything objectionable — giving you big savings advantages in preventing costly waste and damage.

PLUS

* TEMPERATURE CONTROL SAVINGS—Constant low heat conductivity assures positive temperature control — prevents costly food spoilage.

* POWER SAVINGS — Requires only 53% as much power as other insulating materials to maintain low temperature.

* LABOR AND MATERIAL SAVINGS—May be installed just as received from factory — no water vapor barrier need be applied.

TYPICAL INSTALLATIONS

Abbotts Dairies, Inc.
Philadelphia, Pa.

Avco Manufacturing Corp.
Cincinnati, O.

Food Fair Stores, Inc.
Philadelphia, Pa.

Fruehauf Trailer Co.
Chicago, Ill. — Detroit, Mich.

Grumman Aircraft Engineering Corp.
Bethpage, L. I., N. Y.

Geo. A. Hormel & Co.
Austin, Minn.

The Liquid Carbonic Corp.
Chicago, Ill.

Write for our "Design Data Bulletin RBH-53", Dept. IR-5, Great American Industries, Inc., Rubatex Division, Bedford, Virginia.

PIONEER MANUFACTURER OF CLOSED CELLULAR RUBBER

RUBATEX CLOSED CELLULAR RUBBER

LETTERS

(Letters to the editor are welcome from readers of INDUSTRIAL REFRIGERATION on any subject of general interest.)

Sign Stops Complaints

Tucumcari, N. M.

I noticed mention of sign used at my ice vendor in the March INDUSTRIAL REFRIGERATION. The reason behind my putting it there is even more interesting. I had trouble with people failing to put enough coins to make the vendor work. They often called me as late as 2:00 a.m. to tell me they had put a nickel or a dime in the slot and did not get any ice. I hit on the idea that if I could make them stop and think, that I could stop this. As a result, I put up this large sign "When All Else Fails, Try Reading Directions." When customers saw this sign they would invariably stop and think things through and generally would laugh about it. I have had very few complaints since. It put a complete stop to people calling me late at night about the machine not working. That is what I wanted to accomplish.

C. A. MEEKER,
Tucumcari Ice & Coal Co.

Likes New Format

Auckland, New Zealand.

We take this opportunity of letting you know that we are very pleased with the new format of INDUSTRIAL REFRIGERATION. The writer has had the pleasure of reading *Ice and Refrigeration* for many years past, and has been able to utilize some very excellent information published therein.

WILLIAM ENGLE, Manager
Refrigeration Engineering Co. Ltd.

Article Approved

Lancaster, Pa.

You did an excellent job in the publication of this information (cork covering for pipe lines) and I sincerely hope that it resulted in a good response for you from your readers.

CLYDE O. HESS
Assistant Manager
Armstrong News Bureau

I. R. is Helpful

Macedonia, Ohio

Your magazine is very helpful, we appreciate it very much.

DON A. DAVIS, Chief Engineer
Hawthorndens State Hospital

Industrial Refrigeration

formerly **ICE AND REFRIGERATION**

Now in its 63rd Year of Publication

J. F. NICKERSON, FOUNDER

Vol. 126 **May, 1954** **Number 5**

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The Cover:

• Vacuum cooling plant for precooling leafy vegetables for shipment. Cooled lettuce in cartons is removed from cooling chamber (one chamber door is seen open) placed on belt conveyors for delivery into refrigerator car or truck. The Barometric tower at left carries vacuum equipment. This plant cooled ninety-five carloads of lettuce in a 22-hour operation. Story on page 15.

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What's New

MACHINERY
APPLIANCES • PROCESSES

For your convenience in securing additional information on any product desired, write the Readers Service Department.

New Ice Crusher Accessory For Ice Cube Maker

A NEW stainless steel ice crusher designed for use in the Carrier Automatic ice cube maker gives the user the choice of crushed ice or whole cubes. By the turn of a knob, fine or coarse crushed ice can be selected. The new ice crusher was developed by the manufacturer, Franklin P. Miller & Son, Inc., of East Orange, New Jersey.

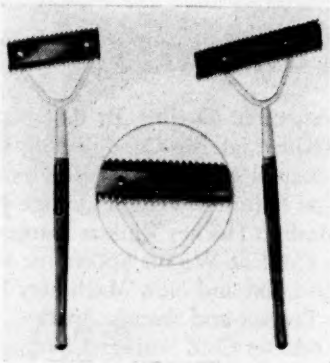
New Carrier Ice Crusher Accessory

The crushing action of the machine is such that fresh crushed ice results. The machine operates as silently as possible, crushing the ice cubes as fast as made in the ice cube maker. When whole cubes are desired, the user turns the knob to shut off the crusher which automatically diverts the cubes to the cube storage bin. Constructed of 18-8 stainless steel, the new ice crusher has a high finish sanitary design. It is ruggedly constructed with heavy duty oil impregnated bearings.

Heavy Duty-D-Froster

A NEW tool for dry defrosting truck plates, cold room plates and coils, open ice cream and frozen food cabinets has been designed by the Marion Glass Manufacturing Co., Marion, Ohio. The new heavy Duty-D-Froster will remove all frost and ice quickly from the cold producing walls it is claimed of low temperature cabinets, then scoop the frost and ice off the bottom of the cabinet into a bucket or a drain sink with the Freezer-D-Froster.

Showing the results of two strokes with the Heavy Duty-D-Froster



The 8 1/4 inch and 12 1/8 inch blade Heavy Duty D-Froster

This device comes in two models: No. 100, with 8 ¼-inch blade and No. 200, with 12 ⅛-inch blade. The serrated blade for both models is made of high carbon steel fully heat treated. The blade is ground sharp on both edges and the D-Froster is so designed that the blade may be easily reversed. The 1¼" handles are hardwood, turned to a comfortable working shape.

New Low Temperature Insulation Material

THE Development of a new Isoflex low-temperature insulation material, designated as Isoflex K-20, said to have demonstrated remarkably low thermal conductivity not influenced by moisture during independent laboratory tests, has been announced by T. M. Elfving, president of Isoflex Corporation.

The new material, a series of corrugated aluminum foil barriers interspaced with resilient spun glass fibre, is adaptable to any use requiring insulation efficiency in the −150 to 450 F temperature range including passenger and refrigerated railroad car, highway truck or steamship construction. It is manufactured in lightweight panels ranging up to six inches in thickness at Isoflex's new West Coast plant.

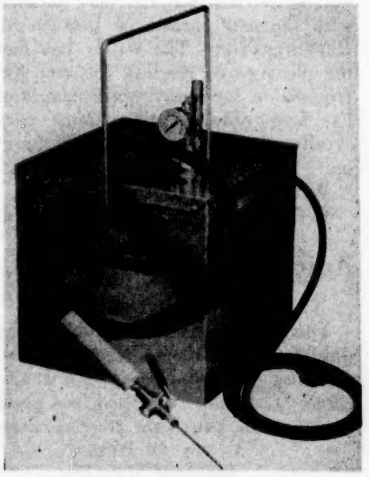
Isoflex low temperature insulation material

Primary feature of Isoflex K-20 is a structural design which divides the total insulation space into a number of layers, thereby also dividing the total temperature difference. Aluminum foils minimize heat transfer by radiation, form an effective vapor barrier, and serve as drainage channels for condensed moisture. Multi-layer structure and glass fibre separators reduce direct heat conductivity and convective currents.

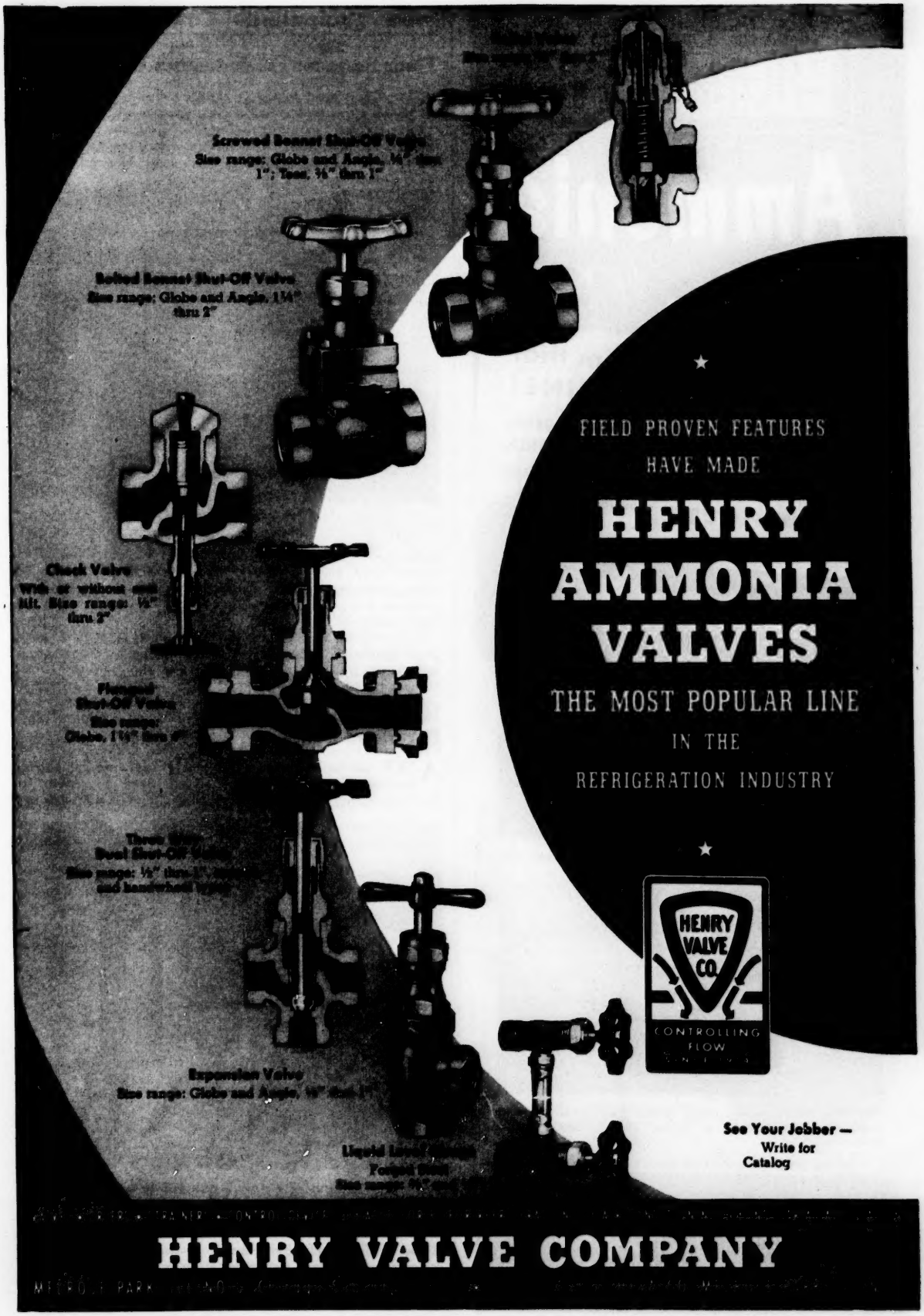
Latest model Pacific Fruit Express and Santa Fe mechanical refrigerator cars are insulated with Isoflex K-20, Mr. Elfving reported as well as new Tenney Engineering Co. of New Jersey test chambers made for the Defense Department. Other Isoflex insulations have been widely used by both American and European refrigeration engineers.

Portable Steam Cleaner

THE cleaning action of pressurized steam is now available with a lightweight, low-priced portable steam cleaner announced by The Halkirk Company, Manhattan Beach, California. It is recommended for degreasing, removing contamination, cleaning of refrigeration units, food handling equipment, vending machines, also for use in sanitizing, deodorizing, and pest control. It is electrically heated on any standard circuit and thermostatically controlled. It is 14 inches square and weighs approximately 50 pounds.



The new Halkirk Steam Cleaner


Screwed Bonnet Shut-Off Valve
Size range: Globe and Angle, ¼" thru 1"; Tube, ⅜" thru 1"
Bolted Bonnet Shut-Off Valve
Size range: Globe and Angle, 1¼" thru 2"
Check Valve
With or without strainer. Size range: ⅛" thru 2"
Flanged Shut-Off Valve
Size range: Globe, 1½" thru 6"
Three Way Dual Shut-Off Valve
Size range: ½" thru 1" screwed and bonnetless types
Expansion Valve
Size range: Globe and Angle, ⅛" thru 1"
Liquid Level Control
Forged Steel
Size range: ½" thru 1"
FIELD PROVEN FEATURES
HAVE MADE
HENRY AMMONIA VALVES
THE MOST POPULAR LINE
IN THE
REFRIGERATION INDUSTRY
HENRY VALVE CO.
CONTROLLING FLOW
See Your Jobber — Write for Catalog
HENRY VALVE COMPANY

THERMOBANK

FOR

Ammonia

by KRAMER

THERMOBANK

the defrosting system that makes Ammonia SHINE!

LUCERNE MILK COMPANY, of Los Angeles, Calif., modernized with KRAMER AMMONIA THERMOBANK automatic defrosting system to end years of expensive manual defrosting.

"BEFORE" photo shows iced condition of the old overhead coils.

"AFTER" photo, same room, modernized with KRAMER Ammonia THERMOBANK at minus 25° F; 6400 gallons hardened daily.

INSTALLED BY ASSOCIATED REFRIGERATING ENGINEERS, LOS ANGELES, CALIFORNIA.

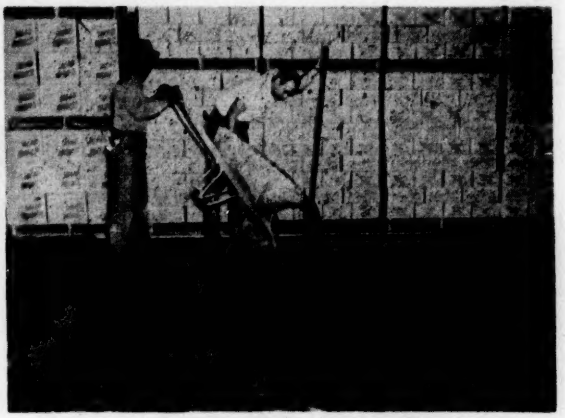
WRITE NOW FOR BULLETIN TA-182

KRAMER TRENTON CO.
Trenton 5, N.J.

New Equipment—Continued

Floor Surfacer For Industrial Plants

FLOORS exposed to the toughest conditions may be reconditioned without disrupting plant production with application of "Miracle Floor", according to The Camp Company, Inc., Chicago, Ill., the manufacturers. It is applicable to the reconditioning of all types of flooring exposed to continuous water, grease, brine,



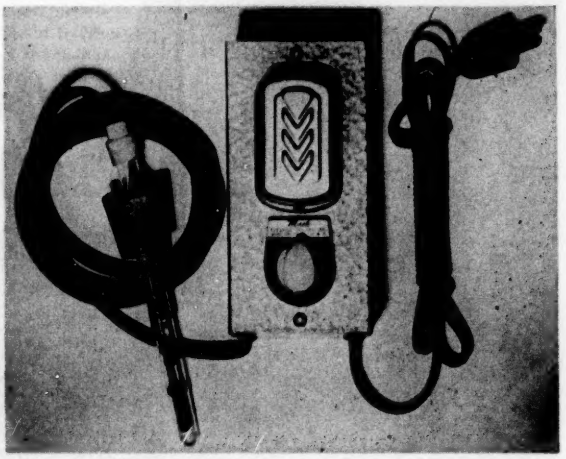
Installation of Miracle Floor in a food plant

acids, alkali, etc. It is offered for use in dairies, ice cream plants, meat packing houses, canneries and food processing plants, breweries, distilleries, beverage plants, chemical plants, refineries and other industries where floors are subjected to adverse conditions.

Under normal conditions it is ready for use in 24 to 48 hours after application, producing a hard, yet resilient, non-dusting, non-slip surface. It is available in red, gray and green.

New Temperature Alarm For Blood Banks

A NEW automatic alarm device that gives an instant audible warning when temperatures in blood banks drop below +3 C or rise above +7 C has been developed by Mack Electric De-

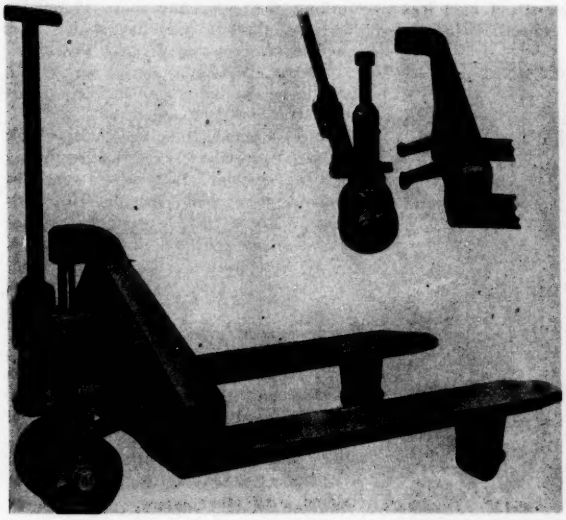


New alarm device for blood bank

vices, Inc., Wyncote, Pa. The unit, called the Type 3-JR-1 Thermo Alarm, by warning of unsafe temperatures permits correction of the condition before spoilage or damage can take place. It comes complete with a waterproof glass cover and mounting cork for a thermostat, that can be inserted quickly in standard 500 cc size containers of the type used in collection of blood by gravity.

New Pallet Trucks For Light or Heavy Loads

A PALLET truck designed for use of both light and heavy loads has been introduced by Paliton, Inc., New York. The lift is accomplished with a smooth functioning, fast acting hydraulic pump, and lowering is done at a controlled speed. These trucks are marketed in 2600 and 4000 pound capacities with fork widths of 20½ and 27 inches.

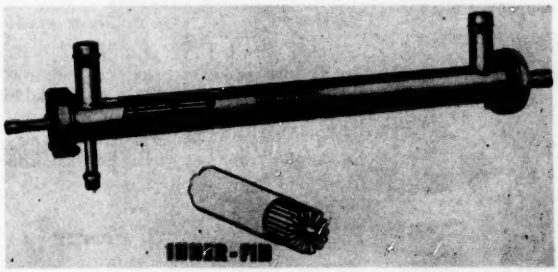


New Pallet Trucks Designed by Paliton Inc.

Four lengths are available for various specific jobs. Each width is offered at the five following varying lengths: Under 36 inches, 36, 42, 48, and 48 to 60 inches. In all there are twenty models from which to choose. The front wheels and fork wheels are each carried on two ball bearings. Complete maneuverability allows for access to difficult corners. Overloading is prevented by a relief valve. The two main assemblies are dismantled by removing only two bolts. The hydraulic unit can be replaced for immediate service. The rams are chrome-faced and the forks are made of pressed steel.

Inner-Fin Chillers For Air Conditioning

A NEW line of inner-fin chillers for use in chilled water air-conditioning systems and other liquid cooling applications has been introduced by Heat-X-Changer Co., Brewster, N. Y. The manufacturer reports that incorporation of patented Heat-X inner-fin construction makes this a compact shell and tube chiller. Copper inner-fins in refrigerant passages increase the heat transfer efficiency, while simultaneously permitting smaller size and lower cost.



Sectional View of Inner-Fin Chiller

The new Heat-X chillers have non-ferrous water passages to prevent any corrosion problems. The refrigerant side is the single-pass type to eliminate oil trapping problem. Selection of water baffle spacings is available to meet a wide range of water pressure drop requirements, and rock cork insulation is available on all sizes.

Taylor specializes in taking TEMPERATURES

WHETHER you want to control and record them, simply record them, or just have a clear, accurate indication of what they are, there's a Taylor instrument that will do the job superlatively well. Help you cut costs; give you new efficiency. Here are just a few of the wide selection. A postcard will bring you *Catalog 300*, with detailed information, or call your Taylor Field Engineer. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.*

⇦ TAYLOR FULSCOPE* CONTROLLER

For *tanks, brine lines, compressors,* etc. Probably the most versatile instrument made for temperature, pressure, flow and liquid level control. Easily adaptable to any operating conditions.

TAYLOR RECORDING THERMOMETER ⇨

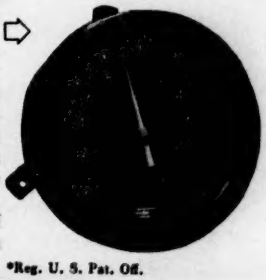
For *brine tanks, brine and ammonia lines, bunker rooms,* or any process in refrigeration where temperature record is required. Available to record in one, two or three different temperatures.

⇦ TAYLOR INDUSTRIAL THERMOMETER

For installation in insulated lines. Sturdy, one-piece, shallow case for wide angle of vision. Triple lens BINOC* tubing and bold, contrasting scale make this the easiest to read of all industrial thermometers. Straight or 90 angle stems. Many other types, ranges and angles.

NEW 6" DIAL INDICATOR

For temperature or pressure ⇨ applications, where periodic reference only is required. Mercury, gas, organic liquid or vapor actuation, as desired. Variety of ranges. All new movement minimizes linkage error—gives greater accuracy throughout span. Fume and moisture proof case can be face or flush mounted.

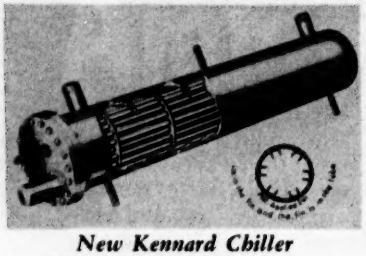


*Reg. U. S. Pat. Off.

Taylor Instruments
MEAN ACCURACY FIRST

New Liquid Chiller

THE bottleneck to heat transfer and the direct exapnsion chiller has long been recognized as the low Freon side coefficient. Kennard Corporation has eliminated this by addition of efficient internal surface to the inside of the tube. This surface is made an integral part of the tube and is not mechanically bonded.



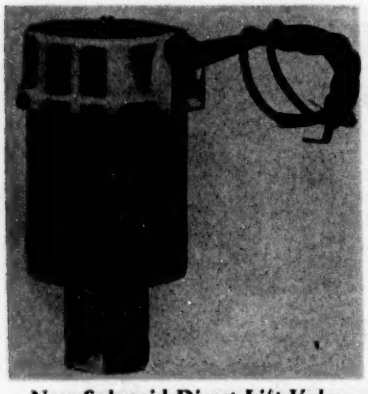
New Kennard Chiller

The Kennard Chiller is designed for refrigerant in the tubes and water in the shell. Liquid refrigerant is distributed to the tube circuits through one or more distributors, each distributor being fed by a thermal expansion valve.

Positive oil return is assured by incorporation down-feed with ample freon circuit velocities. This eliminates oil and trapping and insures accelerated oil return from the Chiller, even at reduced load. Another advantage is that they are lighter and smaller.

New Solenoid Direct Lift Valve

A NEW stainless steel Solenoid Direct Lift Valve in ⅛ and ¼ inch pipe sizes with high corrosive resistance is announced by Atkomatic Valve Company, Indianapolis. Valve bodies are constructed of 303 stainless steel, solenoid armature is 416 stainless. Pressures are 5000 P.S.I. to 150 F maximum, 2500 P.S.I. to 400 F maximum. Orifice sizes range from 1/16 to 3/16 inch diameter depending on pressure requirements and coil used.

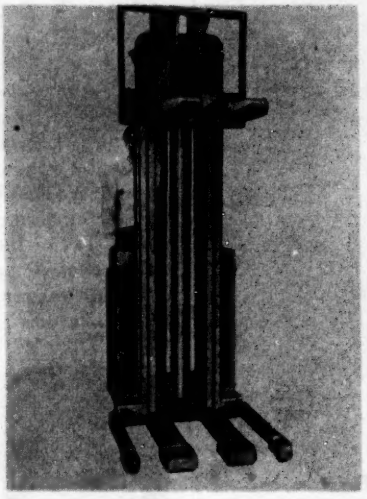


New Solenoid Direct Lift Valve

Paper wound or glass impregnated coils are used depending on temperature range. For use on temperatures in excess of 180 F, glass wound, silicone impregnated coils are recommended. Coils used on normal pressures ranges are single wound, higher pressures use double wound coils.

Narrow Aisle Fork Truck

WORKING with a leading warehouse consultant, the Raymond Corporation, Greene, N. Y., has developed a new model narrow aisle electric fork truck for warehouse operations. It is a modified straddle truck with four base legs, 5 x 2 inches, the load wheels straddling the pallet while the 7 inch wide elevating forks lower over another set of base legs with dual 5 x 2 inch wheels. This arrangement provides for maximum stability at elevated heights up to 158 inches and insures against excessive wheel and floor wear. Furthermore, the truck has excellent turning characteristics and can right angle stack pallet loads from ailses only 6 ft. wide, thus reducing waste storage space to a minimum. The truck is for use with skids, open face or 4-way entry block type pallet where high lifts are required. The block type can be handled also on all four sides by a hand pallet lift truck.



Narrow Aisle Electric Fork Truck

Plastic Lead Seal In Brush Top Cans

PLASTIC lead seal pipe thread and gasket sealing compound is announced by The Crane Packing Company, Chicago, Ill., as available in handy-to-use 1 lb. brush top cans. This provides a permanent type applicator, always at hand for immediate use. The need for cleaning the applicator after each use is eliminated. In general, Plastic Lead Seal can be handled with a greater degree of neatness, it is claimed.

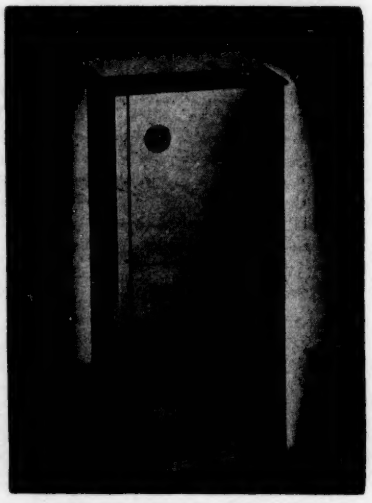
Crane's Plastic Lead Seal

Other advantages of the new applicator are listed as the brush which permits working the compound more thoroughly into the threads, the flat shank from which excess compound can be easily removed without waste, and the fact that it extends to the bottom of the can to enable full use of the contents.

Plastic Lead Seal is an Underwriter's approved permanent, yet non-hardening sealing compound which allows easy disassembly of connections. It withstands pressures up to 6000 psi, temperatures to 500 F, and is insoluble in water, steam, gas, refrigerants and all petroleum products.

New Ice Water Cooler

A PRESSURE-type ice water cooler is announced by The Allen Filter Company, 25 South St. Clair Street, Toledo, Ohio. Designed primarily for plants, offices and stores, the Allen cooler will serve more employees per cooler it is claimed than other types. Allen coolers



Pressure-type ice water cooler made by Allen Filter Company

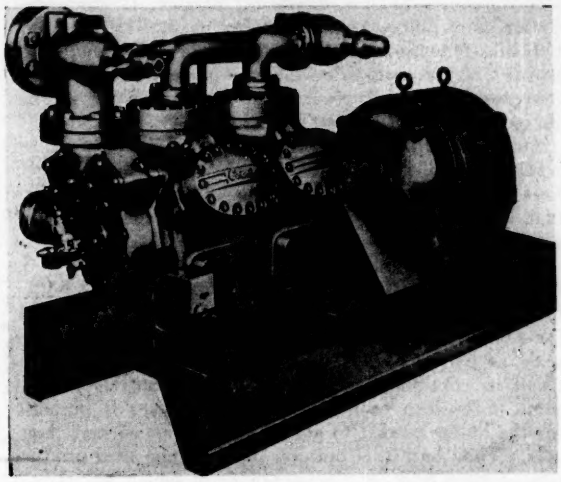
are finished in either brown or gray synthetic baked enamel. They're available in two sizes: 100 lb. and 50 lb ice capacity. Where water temperatures may be variable, the coolers can be used with or without ice.

Plant-Institutional Floors

DEVELOPMENT of an improved oil and grease resistant flooring is announced in a new bulletin published by United Laboratories, Inc., Cleveland, Ohio. Product is known as Sylox and is a type of oxychloride cement that is highly resistant to absorption of oil, grease, fats and solvents of many kinds. Product is complete in itself.

New Reciprocating Compressor For Low Temperature Work

A NEW 12-cylinder, 75 to 100 horsepower reciprocating compressor for air conditioning and refrigeration duty featuring simplified installation and compactness is announced by Carrier Corporation for immediate distribution. The new compressor is designed for use at air conditioning temperature levels, for commercial or industrial refrigeration applications, or for ultra-low temperature work down to minus 100 F.

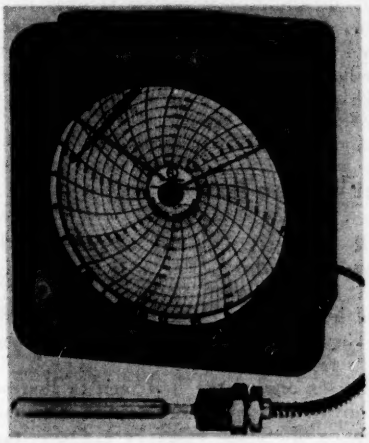


New 12-Cylinder Carrier Reciprocating Compressor

Features include a special oil separator and control system which eliminates oil from the refrigerant circuit and prevents loss of oil on starting, full flow oil filter and new type shaft seal. The compressor automatically adjusts itself to varying loads. Changes in oil pressure depending upon refrigerant temperatures actuate capacity control mechanisms.

New Temperature Recorder

A NEW temperature recorder, Model "1000", with a six-inch, clear-reading, evenly-calibrated chart has been added to the line of industrial thermometers manufactured by The Electric Auto-Lite Company, according to an announcement from the firm's Instrument and Gauge Division. It is available with 24-hour (one chart revolution daily) or seven-day (one chart revolution weekly) electric or mechanical chart drive. Standard chart ranges between minus 40 to plus 550 F, according to need. Pictured is



Model 1000-B portable temperature recorder

Model 1000-B, portable with leather strap handle and capillary tubing on spool at back of case. Other models available are 1000-A, bottom connection wall mounting style with brackets, and 1000-C, self-contained portable with leather strap handle.

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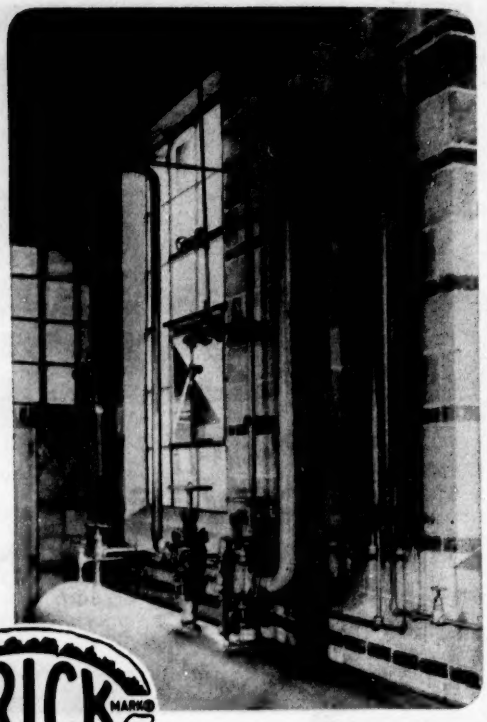

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ELECTRONIC PURGERS PAY FOR THEMSELVES . . .

Engineers have for years relied on purgers for removing air and other non-condensable gases from refrigerating systems.

Ammo. Head Pressure	Brake Hp. per Ton Refrig. 5 Lb. Suct.	15 Lb. Suct.	25 Lb. Suct.
215	2.48	1.85	1.52
205	2.42	1.78	1.47
195	2.36	1.72	1.41
185	2.3	1.66	1.37
175	2.22	1.61	1.32
165	2.15	1.57	1.27
155	2.1	1.50	1.21

Worthwhile savings in horsepower are made by reducing head pressure with a purger.

Larger plants find that automatic purgers save labor as well as power and refrigerant. If you operate an ammonia system of considerable size, check into the merits of the Frick Electronic Purger. Write for Bulletin 199-A, featuring this better automatic equipment.

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PRESS BRIEFS

Change in Butter Parity Brings Temporary Storage Lull — Future Outlook Unchanged

THE reduced parity on butter from 90 to 75 percent which became effective April 1, according to refrigerated warehouse sources, drastically reduced the amount of butter going into storage for a few days after that date; but this reduction was expected to be only temporary and it was the expectation that the normal flow of butter into storage would be resumed in almost the same volume as before April 1.

One of the factors affecting the immediate situation was that retailers stocks were depleted in expectation of lowered prices and their stocking up used up the stocks that would normally have gone into storage. But that was a temporary situation only.

For the immediate and the more distant future it is the expectation of refrigerated warehousemen and butter men generally that the normal flow of butter into storage for sale to the government will be on about the same scale as before parity was reduced. They expect this trend to continue into the far distant future, or until some unforeseen economic condition makes it possible for the butter market to adjust itself along normal channels. They base this opinion on the huge over-production of fluid milk, the consumption of which has shown no increase over the last several years, and with the accompanying over-production, more and more it has been turned into the production of butter and cheese.

In the food markets the consumption of cheese has fared much better than butter which has led to contend with stiff competition. And as long as butter remains at its present price, many consumers it is believed will continue to use oleomargarine to supply at least a part of their needs.

One reason for the static condition of fluid milk is its increased cost, brought about mainly by constantly increasing wages to truckers and other labor, thus in effect pricing itself out of an increasing market which should normally result from a growing population. For this apparently there is no relief in sight.

Although slight reduction in the retail price of butter may result in slightly decreased volume moving into storage, this condition is not expected to alter the situation to any important extent. This is true because, even with its reduced price, the retail cost of butter still will be too high to offer much of a buying inducement to housewives and other customers.

Ice Plant Will be Razed

ONE OF the early artificial ice plants in Lancaster County, Harrisburg, Pa., will be demolished this summer. It is the ice plant of the late Christian L. Herr, now owned by the Herr estate and located just west of the city. The ice plant and the ponds have been a landmark for 65 years.

Mr. Herr was one of the first men in that section to turn to the artificial production of ice as distributors gave up the practice of storing natural ice during the winter. He also pioneered in delivering ice in trucks driven by electric batteries, which disappeared from the streets and highways many years ago. In recent years the plant has been idle and most of the ice making machinery has been dismantled.

Los Angeles Concern Adds Freezer Plant

A NEW 800,000 cubic-foot freezer plant is being built at Mission Road and Jesse Street, Los Angeles, for the Terminal Refrigerating Company of that city. The big project, including land, building and equipment, will cost approximately $1,000,000.

The structure will have precast reinforced concrete walls, with a roof system of wood joists and wood diaphragm supporting the ceiling insulation and covered with five layers of composition roofing and a layer of crushed rock.

The new plant, it was explained by Harlan J. Nissen, vice president of Terminal, will be a reserve bank for retail pack frozen foods, serving distributors, chain stores and the frozen-food industry throughout Southern California and Arizona. This plant, Mr. Nissen said, is the first unit of three ultimately to rise on the four and a half acre site.

Dairy Provides Ice Service When Deliveries Stop

EQUIPMENT to manufacture flake ice at a rate of more than a ton a day has been announced by Boll's Dairy Bar at Concordia, Kansas. The announcement was made on the final day of ice delivery by the Concordia Ice and Cold Storage Company which discontinued production after more than fifty years in business in the same location. The decision to discontinue manufacture of ice was reached by Manager Ernest Huscher several weeks ago when he told customers that consumer demand for ice had reached a non-profit level in operating the large plant. The old dairy has installed equipment for supplying ice for its own needs as well as furnish ice for the wholesale trade and ice in 12, 25 and 50 pound bags will be available at the plant.

Freezing Plant For Bread

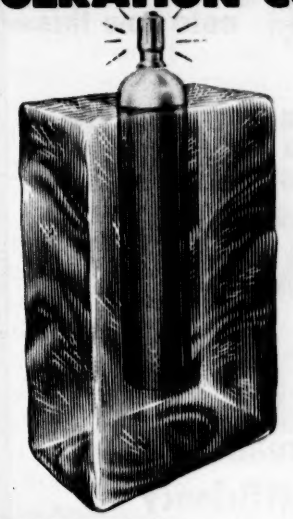
THE nation's first major refrigeration plant designed specifically for the quick-freezing and storage of bread products has been announced by Paul Dean Arnold, president of Arnold Bakers, Inc., Port Chester, New York. Installation of the refrigeration equipment, provided by Carrier Corporation of Syracuse, New York, is expected to be completed by mid-April. The plant will be put into operation shortly thereafter, Mr. Arnold said.

The new plant will cost about $100,000 and will cover nearly 9000 sq. ft. It will provide nearly 12,000 cu ft. of refrigerated warehouse space in addition to the quick-freezing room, a truck bay, office and other work space. The refrigeration system will have a freezing capacity in excess of 1,000 pounds of breadstuffs per hour.

Terminal Refrigerating Co. Adds New Freezer Plant

CONSTRUCTION of a new 800,000 cubic feet freezer plant for the Terminal Refrigerating Company, Los Angeles, Calif. has been announced by J. W. Bernard, general manager of William J. Moran Company, Alhambra, consulting engineers and general contractors for the project. The cost, including land, building and equipment is estimated at $1,000,000. This is the first of three plants to be constructed by the company at the new location where some four and a half acres of land will be used for the project.

Freeze Out HIGH REFRIGERATION COSTS!



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4. **Extremely Low Moisture!**—doesn't freeze up expansion valves, corrode equipment or ice up in evaporators.

Operating costs are lower because you get more refrigeration per pound of Barrett Brand Anhydrous Ammonia than from a pound of any other type of refrigerant commonly used in food lockers, ice plants, cold storage and industrial cooling processes—all at a lower cost per pound for Ammonia. Order a trial shipment of 150, 100 or 50-lb. cylinders today!

GET THIS VALUABLE HELP!

☐ Please send your **FREE** Ammonia Leak Detector Kit. (Pocket size, this handy kit can be used over and over again.)

☐ Please have your specially trained Ammonia Technical Serviceman call, discuss the economical use, etc. of Anhydrous Ammonia. No obligation.

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CHEMICAL PROGRESS WEEK • May 17 to 22, 1954

In planning or estimating low temperature insulation... note how this

FREEZER ROOM

combines loose fill and board insulation for high efficiency at a low cost

Contractor used blower to transport Palco Wool Insulation to roof, then hand-packed to proper density.

Asphalt emulsion and vapor-proof paper with joints well cemented, and a second coat of asphalt emulsion were applied to concrete sub-floor. Three layers of Palco Board were laid with joints staggered. 15 lb. felt was then applied, and a 4" finish slab of reinforced concrete was poured.

New void-free method of installing Palco Wool Insulation allowed complete inspection of wall area before applying interior sheathing. A reprint describing simple void-free packing method is *available on request.*

In order to provide the *best engineering* for this modern freezer room, the *right combination* of insulating materials was required. Loose fill Palco Wool offered high insulating efficiency, light weight, resilience to maintain permanent void-free fill, and ample 12" thickness at low cost for roof and wall insulation.

Laid in three 2" courses, Palco Board provides a 6" overlapping insulation layer on a vapor-proofed concrete sub-floor. With high compressive strength, Palco Board is a most efficient floor insulation that supports heavy storage loads. Both Palco Wool and Palco Board are moisture resistant and odorless.

PALCO WOOL INSULATION
has high efficiency of .255 B.t.u., ideal for all loose fill applications.

PALCO BOARD INSULATION
offers the low thermal conductivity of .30, with high compressive and transverse strength. Available in thicknesses of 1", 2" or 3", sizes 12" x 36", 18" x 36", 24" x 48", and special sizes up to 48" x 72".

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PALCO INSULATION WOOL TRADE MARK

In the Spotlight

THE NEW LOOK of this issue of INDUSTRIAL REFRIGERATION is the result of changing to a new type for the text or body of the reading material. It is, for the most part, 10-point, a slightly larger, hence is more easily read than the 8-point formerly used. This follows the trend in the publishing field toward use of larger type, with a higher degree of legibility. We hope our readers will approve this change.

THE VACUUM COOLING of lettuce and other leafy vegetables has brought about a revolutionary change in the method of preparing these products for shipment from California to eastern consuming centers. The extent of this change and the technique of the vacuum cooling process is fully discussed in the article starting on page 15.

CHANNEL ICING as a means of displaying fresh vegetables in retail stores was the subject of a recent study by Purdue University, in cooperation with the National Association of Ice Industries reported on page 19. This is an efficient method, the study reveals, providing the desired humidity and temperature and retaining weights of the vegetables over the seventy-two hour test period.

INDOOR SKATING rinks are becoming more and more popular as part of a general trend now being felt throughout the schools and colleges of the country. A modern installation at Dartmouth College is described in article on page 29.

A DISCUSSION of the orange situation in Florida where a million more will start to bear during the next three years is presented in the article on page 26.

MORE FREEZER and storage space was needed by The Union Storage & Transfer Company, Fargo, N.D. and to supply this need an addition was built and new refrigerating machinery was installed, adding fifty percent to its former capacity. The story, with pictures, is told in the article on page 31.

PROPER OPERATION of a hotel requires close cooperation with the engineering or mechanical department, not only to effect savings but also to provide smooth and efficient functioning of all departments. This idea is discussed by the supervising chief engineer of one of the hotel chains in article starting on page 33.

AIR CONDITIONING should be standard equipment in every modern hotel and this calls for a control system according to a hotel engineer. See page 36.

QUESTIONS of practical interest to refrigerating engineers are answered in the Question Box of the NAPRE starting on page 40. Can an air Desuper heater serve as condenser in a plant short on condensing capacity? How is moisture removed from a system with certainty? Do capacitors really prevent voltage drop when starting large synchronous motors?

THE USE OF mercury–manometers in ammonia service is discussed, in answer to a question by a reader on page 50.

TONNAGE to air condition six more floors is being added to the Hotel Mayo, Tulsa, Oklahoma, making the entire seventeen floors of the establishment comfort cooled. The installation is described in the article on page 45.

HOW THE refrigerated warehouse industry meets the needs of frozen food packers is told by R. M. Conner, president of the National Association of refrigerated warehouses in article on page 46.

THE REFRIGERATED Warehousing Industry will have added more than seven million cubic feet of freezer storage space by the end of this year, and along with this has adopted better materials handling techniques to take care of special needs, according to figures released by the Association of Refrigerated Warehouses.

FROZEN FOODS from succotash to beef mulled in wine were consumed last year by Americans at a rate of 36 pounds per capita compared with 17 pounds four years ago. Among the 800 odd frozen food items on the market are such things as frog legs, chicken a la king, veal cutlets, meat pies, spaghetti sauce, crab meat au gratin, complete dinners, veal in champagne, etc.

MEAT PRODUCTION under Federal inspection for the week ended March 13 was estimated at 348 million pounds — slightly above the 347 pounds of a week ago and 1 percent above the 344 million pounds produced during the corresponding week a year ago . . . Over-all beef output for 1954 should be about the same as 1953.

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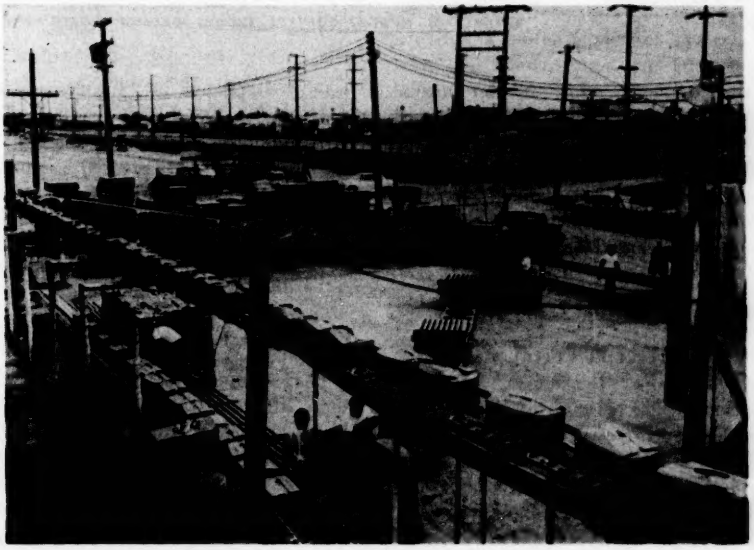
Vegetable Cooling By the Vacuum Method Process

Initiated in 1948, this New Cooling Process is Now Used for Thousands of Carloads of Packaged Lettuce, Requiring Huge Plant Capacities. One Pioneer Plant Cooled 95 Carloads in One Day

WELLS A. WEBB
Research Chemist
Vacuum Cooling Co.



Overhead view of discharge side of vacuum cooling plant. Cooled cartons are proceeding on conveyor belt to refrigerator cars or trucks.

THE revolution in the refrigeration of leafy vegetables began in 1940 when Rex L. Brunsing, San Francisco Traffic Consultant met Morris Kasser and Kasser described his patent[1] for the preparation and shipping of vacuum cooled crates of lettuce. At that time no one would have dared to publicly express a belief that the day was to come when substantially the entire Western lettuce industry would be converted to the vacuum cooling method and thousands of carloads of packaged lettuce would move like clockwork in and out of giant vacuum chambers.

In the critical period of experiment and development from 1940 to 1948 there were many dark days when the vacuum cooling process might have been abandoned. For in that period expressions of apathy and disbelief in the powers of vacuum were the reaction of all but a very few shippers of leafy vegetables.

Pilot Plant

The pilot plant for vacuum cooling was built by Mr. Brunsing in 1946 near Salinas, California. This unit turned out 16 L.A. crates per batch and some 75 partial and full shipments were made during that year. The reception for vacuum cooled lettuce in Eastern markets was so favorable that Mr. Brunsing acquired control of the Kasser patent, organized the Vacuum Cooling Co. in 1948 and built a plant that was capable of cooling approximately 10 carloads of crated lettuce per day.

In 1948 the new facilities were placed at the service of all shippers desiring vacuum cooling. Even though the Eastern buyer's reaction to vacuum cooled lettuce remained favorable, major shippers at Salinas continued to express skepticism and as a result the vacuum cooling plant remained idle much of the time. When the plant did operate it was usually occupied with cooling lettuce that had been harvested from second rate fields or fields from which the best heads had been taken by the major shippers for ice-pack shipments and which were harvested a second or third time by small shippers for vacuum cooled drypack.

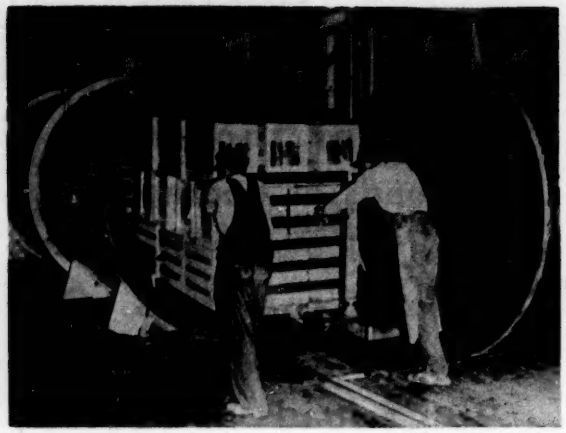
Gradually these shipments of vacuum cooled lettuce became a recognized factor in the wholesale markets. By the early part of 1950 the major lettuce shippers were investigating the new method and taking steps to use Vacuum Cooling Co. services or build facilities for their own use. Demand for the services of the Salinas Plant increased. The capacity of the plant was enlarged and a new plant was built at Watsonville, California.

Fibreboard Cartons

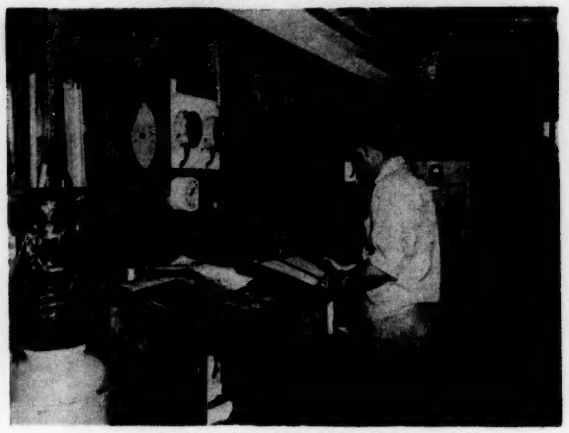
For another reason, the year 1950 proved to be a decisive turning point. Late in that year the use of specially designed heat insulating fibreboard cartons was originated and put into practice by Mr. Brunsing. This method of packing lettuce in partially ventilated cartons and then vacuum cooling the contents[2] was unique, for it provided the first practical shipping method permitting warm produce to be packed in thermally insulated shipping containers after

[1]U.S. Pat No. 2,344,151

[2]Patent pending



Pushing car of lettuce into vacuum chamber in the world's first vacuum cooling plant.



Control room — El Centro Plant. Thermometer indicators on board, control valves behind operator.

which rapid refrigeration was effected by evaporation induced by vacuum. Buyers recognized the advantages of containers that retarded the warming up of lettuce after removal of the package from refrigerator cars.

The shipping method employing cartons caught on immediately, the use of cartons spread quickly, and the result was rapid growth and acceptance. Even though cartons were not introduced until late in 1950, shipments of vacuum cooled lettuce in cartons equalled shipments in crates for that year. The next year doubled the previous year's business. The demand for vacuum cooling services increased by a nearly geometrical ratio each year since 1951. Engineers and chemists busied themselves with the multiplicity of technical problems that arose as result of this growth, and new developments were added.

The most spectacular of the newer developments relate to the special vacuum equipment and the materials handling method that, together, made it possible to schedule the traffic and remove the heat from enormous quantities of produce during days of greatest demand for the cooling service.

Record Cooling Job

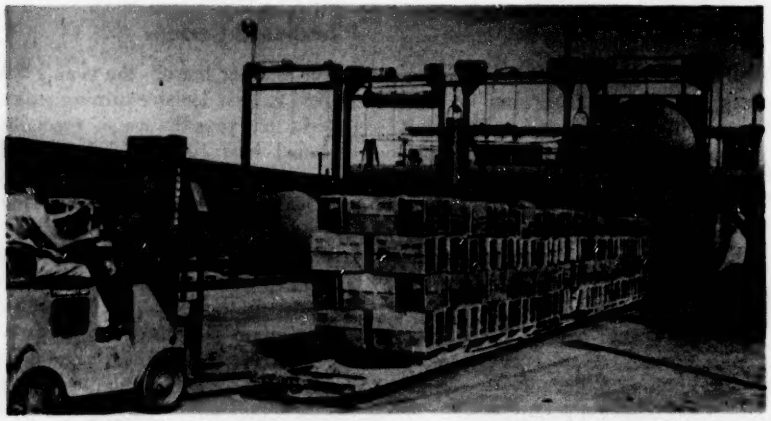
One day at El Centro, California. early in 1952, the harvest was at its peak and 95 carloads of lettuce were scheduled for cooling at the Vacuum Cooling Company's plant. This required the unloading of about two hundred trucks or trailers at the cooling plant doors, temporarily warehousing the cargoes, continually feeding the produce into vacuum chambers for cooling, then routing the cooled produce over conveyor belts to the correct refrigerator car or truck for loading. Any hitch or delay could cause stoppage of the entire operation. The day's work was accomplished in 22 hours and a nearly equal load was handled the following day. But the shippers and farmers were not pleased. Their trucks had been delayed, sometimes for an hour or more awaiting unloading at the vacuum cooling plant. Engineers went to work on the problem.

Lift-Truck Utilized

The solution was found when a giant lift-truck was utilized to handle a specially designed multiple fork. The multiple forks went underneath all ten pallets, lifted off the entire truckload, then trundled the load into the warehouse. Early in 1953 trucks were unloaded by the new multiple fork as rapidly as the drivers could untie their loads.

The giant fork lift solved a second problem, this one inside the warehouse where pallets of lettuce stood awaiting their turn to be placed on dollies that took them into the vacuum chambers. The load for a vacuum chamber was twelve pallets, each of which carried 32 cartons of lettuce. Before the time of the giant lift-truck, twelve trips were required with a small lift-truck carrying a single pallet. But by the new procedure, in one trip the large lift-truck deposits ten pallets on the dolly while the small one adds two more.

By the old procedure ten or fifteen small lift-trucks were darting all over the plant, and never doing the handling job satisfactorily. By the new method, two giant lift-trucks and one small lift-truck moving leisurely do all the work of unloading the delivery trucks and loading the dollies.



Pushing warm lettuce into one of four vacuum chambers.

Giant lift truck carrying multiple fork approaches loaded delivery truck. Truck will be unloaded in a single operation.

Vacuum Chambers

The vacuum chambers have a door at either end. Produce enters one door, is cooled and is removed from the opposite door. One at a time the cartons of cooled lettuce are set off the dollies and carried by the belt into the refrigerator car or truck where they are loaded. Speed is achieved by use of two belt conveyors so that two set-off crews and two loading crews can be employed.

The two conveyors are double decked on the loading platform. Thus two dollies are being unloaded and two refrigerator cars are being loaded simultaneously. Two-way voice communication between the set-off crews and the loading crews facilitates routing the merchandise and ensures control of the conveyors.

The Vacuum System

Vacuum Cooling Co. employes a two-stage steam evactor air pump for primary evacuation and a three-stage steam evactor system for removing water vapor from the vacuum chamber during the cooling part of the cycle. Air evacuation with the two-stage system is carried out until the vacuum reaches the point where cooling can commence. Then water vapor evacuation is carried out with the three-stage system until the produce is sufficiently cool. Air is then admitted, the doors are opened, the cooled charge is removed and a new charge is entered.

Viewed thermodynamically, heat enters the three-stage system from two sources, water vapor from the lettuce and steam from the boiler. A part of this heat is absorbed by flowing water in barometric inter-condensors placed after the first and second steam jets. The balance of the heat is dissipated by the third steam jet which discharges at atmospheric pressure into a boiler feedwater heater; steam not condensing there goes to the atmosphere.

Cold water for the barometric condensors at the El Centro plant comes from the city water supply, at some other plants it is pumped out of wells located on the premises; such water, warmed by passing down the condensors, is discharged into a sewer or into a second well. Where fresh cold water is unavailable in quantity the water in the system is conserved and recycled by pumps; heat is removed from it by means of conventional water cooling towers.

In addition to the steam jet method which is employed by Vacuum Cooling Co., it is practical to use mechanical vacuum pumps with the provision, however, that a means is made available to collect by freezing or condensing the large volume of water vapor that is generated within each vacuum tube as evaporation takes place. In locations where refrigerating plants are close by, ammonia or cold brine can be used to freeze out or condense these water vapors in any one of many possible forms of heat exchanger or condensor. The mechanical vacuum pump then operates to remove from the condensor air leakage mixed with a negligible volume of water vapor.

If the vapors were not condensed out, but were sent directly from the lettuce cooling chamber to a battery of mechanical vacuum pumps, the total volumetric capacity of the pumps would have to be enormous to achieve an equivalent refrigeration effect. A simple calculation will illustrate: To cool to 33 F a vacuum chamber containing a full charge of 14,400 pounds of lettuce of 0.95 specific heat, 548,000 Btu must be extracted if the initial temperature is 73 F. To effect that amount of cooling, 506 pounds of water must be evaporated from the lettuce leaf surfaces[3]. The average volume of this amount of water vapor (at 50 F, and 0.178 lbs. per sq. in. absolute pressure) is 1703 cu. ft. per lb.

Thus an average of 861,000 cubic feet of vapor would have to be pumped by one or more mechanical pumps during the cooling period of 15 or 20 minutes. The pumps would therefore have to have a total capacity of 57,400 cubic feet per minute.

[3]Average enthalpy of water vapor over the cooling range 73-33 F is assumed to be 1084. Chemical Engineer's Handbook, John H. Perry, (1950) Page 277.

General view of Holtville plant Vacuum Cooling Company. Delivery trucks being unloaded, warehouse, water cooler, barometric tower, boilers spur track with refrigerator cars awaiting loading.

Thirty-four vacuum pumps of the largest size, each driven by a 100 hp motor would hardly be sufficient to handle such a vapor load.

The Vacuum Cooling Co. has used steam jet evactors for two reasons. Their plants are entirely self contained and independent of any refrigeration supply, and their initial cost is considerably less. In addition, the management believes that this type of plant accomplishes a more thorough job of cooling.

Mechanical Arrangement

The mechanical construction and arrangement of the cooling chambers and vacuum system is as follows: Each vacuum cooling tube or chamber is 51 feet long and 7½ feet in diameter. Plants have three, four or seven such tubes, the seven-tube plant is located at Salinas. Nominal rated cooling capacity is one carload per tube per hour.

A hydraulically operated poppet valve connects each vacuum chamber to each of several large diameter overhead manifolds or headers. Every header leads directly to a steam jet evactor system that draws the vacuum.

In starting the cooling operation, a vacuum chamber is first evacuated by opening the poppet valve connecting it to the header that leads to the primary evactor (the two-stage system). When suitable vacuum has been drawn, the valve is closed and one or more valves are opened connecting the vacuum chamber in parallel with headers that lead to three-stage evactors. The latter improve the vacuum and cause the cooling.

Control of Cooling

The rate of cooling depends not only upon the initial temperature of the load, but also upon the solidity, as extremely firm heads of lettuce release the vapors less freely than softer, spongy heads. Thermometers and recording instruments, connected by flexible cables from the instrument board to the produce inside the tube, are used to control the cooling process; the sensitive element of the thermometers are in direct heat transfer relationship to the produce being cooled. The attending operator at the instrument panel controls the operation of the plant, and issues a certificate of Certification of Cooling on each car from the master charts which are kept on record for inspection by the purchaser of the cooling service, should any question arise regarding arrival of the shipment.

Residential Air Conditioning Offers Big Market — Chicago ASRE Topic

RESIDENTIAL air conditioning was the topic of Burton Faigen, Carrier Corp., at the March 11 meeting, Chicago Section ASRE. Mr. Faigen's talk touched upon four major phases of year round residential air conditioning, which he defined roughly as the market, the equipment, the engineering, and the future.

According to the speaker, although the market originated in the South and Southwest, it is just as active in more Northern sections of the U. S. today. He cited constructions in St. Louis, Chicago, Cincinnati, Detroit, New York and Boston, with homes in the 12,000 to 17,000 dollar bracket where year-round air conditioning is being sold on project-size basis. More than one million new homes will be started in 1954, according to Mr. Faigen, of which 30 per cent will be considering air conditioning and 15 per cent are expected to definitely install. The speaker quoted figures on types of heating plants in the U. S. home, giving percentages using gravity and forced warm air, and those using wet type systems. It was estimated that 2/3, or 12½ million homes have systems which can be modified or easily replaced for central air conditioning units.

Residences Air Conditioned

Mr. Faigen stated that the residence does not exist which cannot be air conditioned. Ways and means are multitudinous; new homes the easiest; existing and older ones the more difficult; but all are capable of being equipped. After a discussion of the types of cooling units available and their most practical applications, considering the type of heating plant existing or planned, the speaker took up the topic of condensing media. He favored air over water, citing the disadvantages of water supply, waste, contamination, legislation, unsightly cooling construction, maintenance, etc. The speaker implied that the air condenser for the refrigeration unit of the home air conditioning system will become as common as the air condenser on the household refrigerator or freezer cabinet.

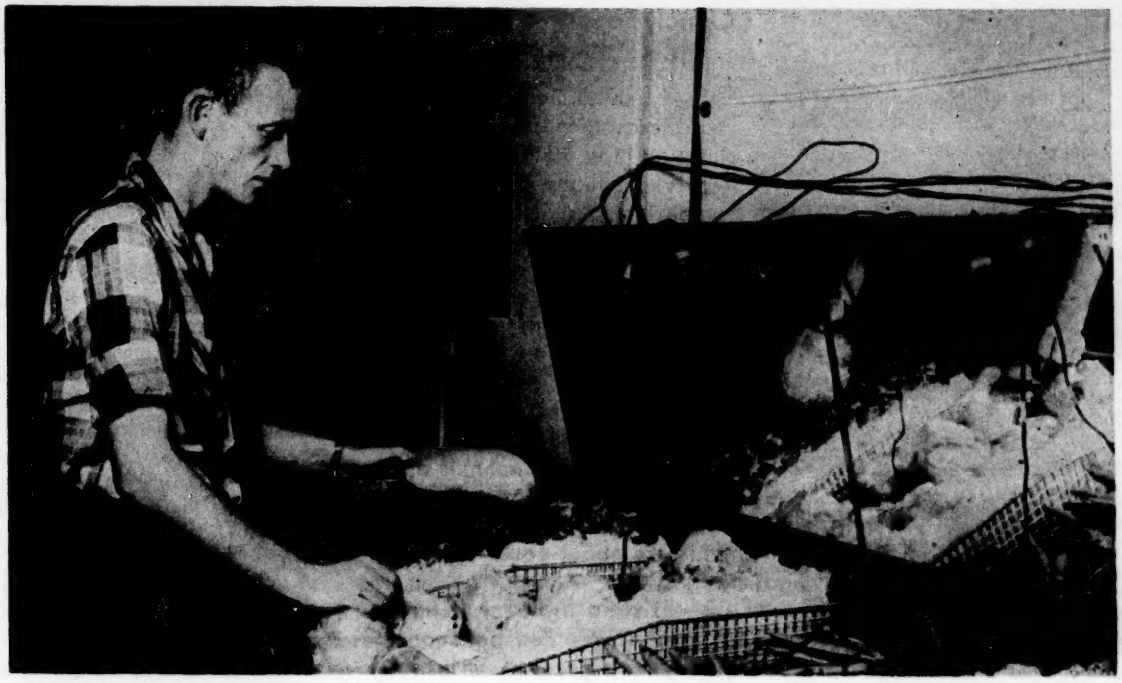
Engineering of home air conditioning system poses four major items for consideration he said. They are: cooling load and equipment selection; air distribution; sound levels; and operating costs. Residences cannot be figured in the same manner as estimating the cooling requirements of a commercial installation. The speaker detailed the differences, and backed up the statements with summaries of experiments conducted with actual home systems, by his firm. Some seven conclusions were offered, indicating desirability of smaller equipment operating nearly 24 hours per day at peak seasons, with overall lower operating cost and longer equipment life, less irritation from sound and light flickering, and less complicated engineering.

Air Distribution and Return Systems

Air distribution and return systems came in for some detailed discussion by the speaker. Mr. Faigen cited a bold step by the Federal Housing Authority, in a bulletin ME-10, to describe and limit sound level of acceptable air conditioning systems in homes covered by approved loans, at 45 decibels. He also related a recent court case pertaining to outside noise level from a neighbor's air conditioning equipment. Minor engineering considerations, in the speaker's opinion were: ventilation for combustion, breathing, and odor control; architectural details; construction codes and regulations; and public inertia. For the future, Mr. Faigen visualized better living through year-round air conditioning and listed six aspects which should be welcome help to builder, engineer, and sales forces involved in residence sales.

Largest Office Building Air Conditioned

GROUND was broken recently for the 42-story Socony Vacuum Building, in New York, which will be the largest commercial air conditioned building erected in New York in a quarter century. The project will represent an investment of $45,000,000.



Channel ice displays should be sprinkled with cold water and garnished with ice each time channels are reiced.

CHANNEL ICING FOR VEGETABLES

Study conducted by Purdue University shows channel icing as means of displaying fresh vegetables provides desired humidity and temperatures, and retains weights.

ERIC C. OSTERLE
K. L. FAWCETT
Purdue University, Lafayette, Ind.

THE latest innovation in the use of snow ice for refrigerating fresh vegetable retail displays is the "Ice Channel." Channel icing as the name implies involves the confinement of snow ice in wire channels. These channels or ice ribbons, are spaced throughout the retail vegetable display. Cool temperature and high humidity furnished by the melting ice in the channels refrigerate adjoining vegetables and retard moisture loss from the vegetables.

Wrigley's Super Markets, in Grand Rapids, Michigan developed this method of ice refrigeration in 1951 and employ it exclusively in their produce departments. Wrigley's reported that the ice filled channels, in addition to supplying abundant moisture and low temperature required to protect freshness of vegetables, acted as dividers between vegetables and facilitated neatness in displays. Channels were superior to the conventional ice bed method of vegetable display in that channels could be easily reiced and required less ice. The gleaming ice ribbons added greatly to the eye appeal of the vegetables between channels, Wrigley's claimed.

The Ice Channel Method

Introduced by Wrigleys at a regional produce meeting in 1952, ice channels were soon commercially produced and available to the grocery industry. Many questions were directed to the research division of the National Association of Ice Industries in Washington, D. C. regarding the performance and requirements of this method of vegetable icing. In order that a background of scientific information might be developed, the Ice Association financed a research grant with Purdue University. A preliminary investigation of channel icing of retail vegetable displays was conducted in June and July of 1953.

Before any experimental data were collected by the Purdue University research staff, channel icing was thoroughly explored so as to determine factors contributing to maximum performance. The procedure developed and practiced during the evaluation studies is summarized below.

It is commonly known that vegetables need abundant moisture (relative humidity 85-100 percent) and cool temperatures (32-40 F.) if they are to remain fresh and attractive on retail displays. The ice channel method supplied cool temperature and high humidity to the vegetable display by means of melting ice. Air, cooled and humidified by the melting ice in the channels, was circulated by convectional movement down into the false bottom under the vegetables and moved upward through the vegetables. The refrigeration principle is similar to the commercial ice refrigerator or refrigerated railroad car.

Melting ice from the channels covered the bottom layer of the display fixture with a layer of cold

water. Circulating air, passing over this expanse of free moisture, increased its humidity and transferred part of this additional humidity to the vegetables through which it circulated. Temperatures of the vegetables remained low due to contact with the adjacent ice in the channels.

Commercial ice channels available on the market and used in the studies were 3 inches wide, 7 inches deep, and of adjustable length from 27 to 38 inches so as to be adaptable to most conventional vegetable display fixtures. The wide mesh of which the channels were made allowed for maximum transfer of cold air and moisture from the enclosed ice to the vegetables.

The six foot "ice bed" display cases, made available for the studies, were each equipped with false bottoms 6 inches deep, which were covered with a fine wire mesh. These false bottoms were constructed so that no cross braces obstructed the flow of cold air from one end of the case to the other.

Trough Facilitates Reicing

In order that this narrow channel could be iced quickly, a special V shaped trough was built. The trough fitted completely over the outer edge of the entire channel. This provided the person who was reicing channels with a larger surface into which to scoop ice. When the trough was removed, a 3 inch peak of ice remained on the channel. This peak towered above the surface of the vegetables and allowed cold moist air to flow over the top layer of the vegetables.

In no instance were vegetables placed higher than the top of the channel. Vegetables were never placed over the channels. The flow of cool, moist air from the ice peak on the channel was essential to retard drying out of the top layer of vegetables.

Ice in the channels melted away from the edges and needed to be packed down before additional ice was added. A narrow flat, ice scoop that could be inserted into the channel was found extremely useful in that packing and reicing could be done with the same tool.

Channels were reiced when ice in the channels melted down below the top layer of the display. Whenever channels were reiced, however, vegetables in the display were thoroughly sprinkled with ice cold water and garnished with snow ice.

In all of the experimental trials, vegetables were left in the display over night. Ice channels were filled, vegetables sprinkled and heavily garnished, and the entire display covered with a thick cloth which had been thoroughly moistened. The fact that vegetables were continually exposed to the temperatures and humidities from various display methods for the 72 hour trial period should be borne in mind when results are studied.

Ice Channel Spacing

The first phase of the study concerned the effect of various spacings of ice channels in vegetable displays on weights of the saleable product, temperatures supplied, and amounts of ice required.

Four, 6 foot conventional bed ice cases, each equipped with a false bottom, were fitted with different numbers of channels at measured intervals. The space between channels or a channel and the end of the display fixture was designated as a "cell". Spacings of 14, 18, and 24 inches between channels, were compared. This meant that a six foot display fixture with a 14 inch spacing between channels required five channels, an 18 inch spacing three channels, and a 24 inch spacing two channels. By placing channels directly against each end of the display fixture and spacing the remaining channels at 24 inch intervals, a four channel, 24 inch spacing set up was acquired in the fourth display fixture.

Three Vegetables Used

Three vegetables, celery, carrots, head lettuce were used in the trials. These vegetables were considered representative of the perishable vegetables which are refrigerated by retailers. Vegetables were obtained from a local wholesaler and from similar lots.

Head lettuce and celery were carefully trimmed before display. All vegetables were washed in cold water, then placed in their respective locations to drain thoroughly. Weights were taken in the same order as the original placement ie — those washed first were weighed first. This weighing order prevailed throughout the trials.

Weighings were recorded at 12 hour intervals. Initial weighings were usually made by 9:00 a.m. so that vegetables were exposed to conditions similar to those in a retail store. Evening weighings were made around 9:00 p.m.

During the day ice was replenished in the channels when necessary. At this time each cell was sprinkled with cold water and garnished with ice. Weights of all ice were recorded. Vegetables were timmed for eye appeal when necessary.

Temperatures in each cell were measured by thermocouples placed inside of vegetables centrally located in the approximate center of each cell. Readings were taken simultaneously at 12 hour intervals.

Spacing of Channels

Table 1 shows the effect of the various spacings of snow ice chan-

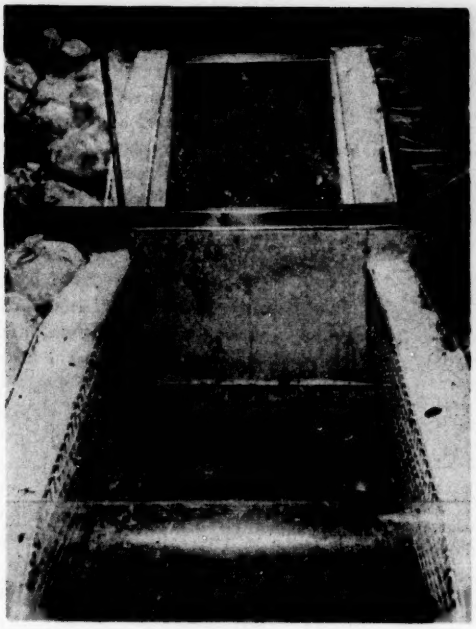
Conclusions From Studies on Channel Icing

1—Channel icing of fresh vegetables provides an efficient method of refrigerating fresh vegetable retail displays, comparing equally with accepted conventional methods in protecting freshness in vegetables.

2—When compared to the conventional snow ice bed method, the ice channel uses about 40 percent less ice and offers the added advantage of ease of reicing. Channels also serve as dividers between vegetables. Man hour requirements are about equal for both methods.

3—Existing dry rack fixtures in retail stores can be economically refrigerated with ice channels. The conversion of bed ice equipment for channel icing seems justifiable based on the more efficient use of ice by the latter method.

4—Efficient refrigeration of vegetables with ice channels requires strict attention to recommended operational practices.



Left: For maximum circulation of cold air, a false bottom, at least six inches in depth and covered with a narrow gage hardware cloth is recommended.

Above: Using a V-shape, trough and wide ice scoop facilitates to reice channels in vegetable display. The level of ice in channels must always be above the top layer of the display.

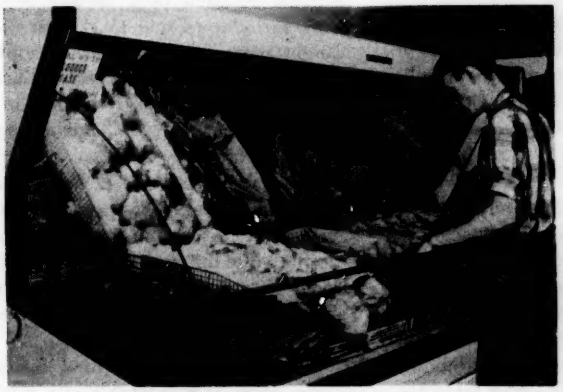
nels on the weights of the saleable product. Results are presented as indexes; original weights expressed as an index of 100. Weights of all three vegetables have been averaged together and treated as "produce".

Two, 24 inch spacing trials were conducted in an effort to determine the effect of location of channels upon retention of original weight and temperatures maintained. These results are included in Tables I, II and III. The two-channel 24 inch spacing trial involved locating the two channels 24 inch from each end of the display fixture. The four-channel 24 inch spacing resembled the two channel 24 inch spacing except for the addition of two more channels located directly against the ends of the display case.

No significant differences as far as total relative weights retained (Table I) resulted from this comparison. Temperatures however, in the two-channel 24 inch spacing were significantly higher than the four-channel, 24 inch spacing, which were comparable to the temperatures of the 14-inch, two-channel spacing.

During the first 24 hours, no significant differences existed between weights of produce displayed in various spacings. After 48 hours significance at the 95 percent level existed between the five channels, 14 inch spacing and the four channel, 24 inch spacing in favor of the 14 inch spacing. At the conclusion of the trial the 14 inch spacing had a greater total weight; the difference was significant at 95 percent over both the 24 inch, two-channel and the 24 inch, four-channel. The 14 and 18 inch spacings retained greater percentages of the total weight than the 24 inch spacing, but the difference between the 14 and 18 inch spacing or the 18 and 24 inch spacings were not significant.

Over the 72 hour period, the average interval temperatures of vegetables displayed in 14, 18, and the 24 inch, four-channel spacings differed very slightly. However, the temperature of the 24 inch, two-channel display was significantly higher than that in the other three spacings. Table II summarizes the results of



Vegetables can be left overnight on channel ice displays if properly moistened, garnished with ice and covered with heavy damp cloths.

The experimental setup during comparison of refrigerated channel ice, snow ice bed, and the ice channel vegetable retail displays. Wires are thermocouples for recording temperatures. The technician is reading relative humidity in the displays.

the temperatures resulting from the four conditions.

The weight in pounds of ice required to fill channels and garnish produce are presented in Table III. Total amounts of ice were highest for the 14 and the 24 inch, four-channel spacing. Both of these required four channels per six foot of rack. The differences between the 18 inch spacing (3 channels per six foot of rack) and the 24 inch (2 channel per six foot of rack), the 18 and the 24 inch, four-channel, the 18 and 14 inch channels, the 14 and the 24 inch, two-channel, or the 24 inch, two-channel and the 24 inch, four-channel were highly significant.

TABLE I. The Relative Total Weights of Saleable Produce[1] Retained by Four Spacing Trials of Snow Ice Channels Over a 72 Hour Period. Index of Weight of Saleable Product

Hrs.	14-inch Spacing	18-inch Spacing	24-inch Spacing Two Channel	24-inch Spacing Four Channel
0	100.0	100.0	100.0	100.0
12	101.0	101.0	100.9	101.1
24	98.0	98.1	97.4	95.8
36	101.2	99.2	98.4	96.8
48	96.8	94.4	94.0	92.8
60	98.5	96.8	95.5	94.7
72	95.8	93.7	92.5	91.9

[1] Average of three vegetables, celery, head lettuce, carrots; Original weights expressed as index 100. See footnote for significant differences.

[1]Least Significant Difference	99% level	95% level
Spacing Between Channels	5.09	3.16
Times Between Readings	4.01	2.66

TABLE II. Average Temperatures[1] Maintained by Four Spacings of Snow Ice Channels Over a 72 Hour Period.—Degrees Fahrenheit

Hrs.	14-inch Spacing	18-inch Spacing	24-inch Spacing Two Channel	24-inch Spacing Four Channel
12	36.3	35.9	39.8	36.8
24	40.3	41.5	45.4	40.6
36	40.7	42.8	45.5	37.2
48	40.0	42.2	49.0	42.7
60	38.0	38.7	42.7	38.0
72	40.6	42.5	46.7	40.6
Ave.	39.3	40.6	44.9	39.3

[1]Least Significant Difference	99% level	95% level
Spacing Between Channels	6.99	3.86
Times Between Readings	6.99	3.86

TABLE III. Pounds of Ice Required to Garnish Displays and Supply Channels for Four Trial Spacings of Snow Ice Channel Over a 72 Hour Period.[1]

Hrs.	14-inch Spacing	18-inch Spacing	24-inch Spacing Two Channel	24-inch Spacing Four Channel
12	167.8	145.8	123.8	170.5
24	93.5	90.8	82.5	99.0
36	137.5	129.2	99.0	121.0
Total	398.8	365.8	305.3	390.5
Ave./ day	132.9	121.9	101.8	130.1

[1]Least Significant Difference	99% level	95% level
Spacing Between Channels	9.78	4.76
Times Between Readings	10.9	5.14

The 18 inch spacing (three channels per 6 ft rack) was chosen for comparison with other methods of display. This spacing retained 93.7 percent of the original weight of produce over the 72 hour period, required only 122 pounds of ice/ft /week, and maintained an average temperature of about 41 F. Conditions prevailing in retail operations will vary and retailers will undoubtedly adjust spacing of channels to the size and shape of the vegetables. Spacings less than 18 inches are impractical not only from the standpoint of temperatures maintained and ice required, but from the standpoint of reduction in display surface by a foot of snow ice channels (4-3 inch wide channels).

Comparison of Four Methods of Display

The second phase of the channel icing study involved a comparison between four methods of retail display. Included in this comparison were:

1 — *Refrigerated, Sprinkled* — gravity cooled mechanically refrigerated display fixture. Produce displayed sprinkled with cold water during day as needed; covered with damp cloth overnight.

2 — *Refrigerated, ice channel* — Gravity cooled mechanically refrigerated display fixture. Ice channels located every 24 inches. Produce sprinkled and garnished with ice daily when channels were reiced; covered with damp cloth overnight.

3 — *Channel Ice* — 6 ft fixture equipped with 6 inch deep false bottom of wire mesh; three ice channels placed at 18 inch intervals. Produce sprinkled and garnished with ice daily when channels were reiced; covered with damp cloth overnight.

4 — *Snow Ice* — 6 ft insulated fixture. Produce displayed on bed of snow ice, sprinkled and garnished as needed. Bed of ice replenished when necessary. Produce garnished heavily and covered with damp cloth overnight.

Pascal celery, head lettuce and carrots with tops were secured from a local wholesaler. Each item procured was of the same brand and source. Celery and head lettuce were then trimmed, carefully washed, and placed in designated cells chosen at random for each display fixture. After all items had been placed, initial weights were taken in the same order as the placement of vegetables in cells. This allowed for excess moisture from washing to drain from vegetables. Weighings were made every twelve hours for seventy two hours. Temperatures were recorded every 12 hours, by thermocouples; the recording points were located inside of vegetables.

Channels were packed and refilled on the average of four times daily. All produce was sprinkled with cold water followed by a garnish of ice. Amounts of ice used to reice channels and garnish produce were recorded. The time required to perform the various operations in connection with each display was recorded by stop watch.

Discussion of Results

Under the conditions of moisture and temperature as supplied by each of the four methods of retail vegetable display, no significant differences in the weight of the saleable product resulted over the 72 hour trial period. (Table IV) Losses in weight recorded at 48 and 72 hours resulted from trimming celery and head lettuce. The reduction in weight resulting from the trimming varied slightly between display methods. At the end of the 72 hour period during which the produce was continually exposed to the conditions supplied by the method of display, all display methods retained about 95 percent of the original weight of the merchandise displayed.

Temperatures, as recorded inside of the displayed vegetables by thermocouples, Table V average 47 F for the refrigerated sprinkled display, 42 F for the refrigerated channel ice

TABLE IV. The Relative Total Weight of Saleable Produce Retained By Four Methods of Retail Vegetable Display Over a 72 Hour Period.[1] Index of Weight of Saleable Product

Hrs.	Refrigerated Sprinkled	Refrigerated Channel	Channel Ice	Snow Ice
0	100.0	100.0	100.0	100.0
12	101.0	102.3	103.9	102.0
24	98.0	100.8	99.5	99.6
36	99.5	102.8	101.4	100.5
48	95.4	98.8	98.9	97.7
60	96.7	99.6	100.7	99.0
72	95.8	94.6	95.9	94.8
Ave.	97.7	99.8	100.0	99.1

[1]Least Significant Difference

	99% level	95% level
Between treatments	6.93	3.88
Times Between Readings	4.82	3.00

display, 45 F for the channel ice display, and 45 F for the snow ice display. Room temperatures averaged 82 F over the trial period. The addition of ice channels to the refrigerated, sprinkled display accounted for the 5 F average difference between the refrigerated sprinkled and the refrigerated channel displays

TABLE V. Average Temperatures Maintained by Four Methods of Retail Vegetable Display Over a 72 Hour Period.[1] Degrees Fahrenheit

Hrs.	Refrigerated Spr'kl'd	Refrigerated Channel	Channel Ice	Snow Ice
12	48	42	49	43
24	44	45	47	48
36	47	44	47	51
48	49	41	45	44
60	47	38	42	37
72	47	38	41	49
Ave.	47	42	45	45

[1]Least Significant Difference

	99% level	95% level
Between treatments	5.09	3.16
Times Between Readings	4.01	2.66

The time required to reice channels, sprinkle and garnish produce are summarized in Table VI. The refrigerated sprinkled display required an average of three minutes per day to sprinkle cold water on the produce and cover and uncover the case for overnight. The addition of ice channels to the refrigerated sprinkled display increased the average time to 14 minutes per day. Channel ice required an average of 15 minutes per day; snow ice an average of 16 minutes per day. All figures on maintenance time are for six foot display fixtures.

TABLE VI. Average Man Hours Required To Operate Four Methods of Retail Vegetable Display Over a 72 Hour Period.[1] Man hours in minutes and seconds.

Hrs.	Refrigerated Spr'kl'd	Refrigerated Channel	Channel Ice	Snow Ice
24	3 20	19 32	19 19	20 4
48	2 48	12 24	14 29	20 42
72	2 39	10 06	12 44	7 35
Total	8 47	42 2	46 32	48 21
Ave.	2 55	14 —	15 30	16 7

[1]Least Significant Difference

	99% level	95% level
Between treatments	9.78	4.76
Times Between Readings	10.92	5.14

The total average weights of ice used in maintaining the refrigerated channel, the ice channel and the snow ice display over the 72 hour period are summarized in Table VII. The refrigerated channel required 94.5, the channel ice 147.9, and the snow ice 245 lbs. at the end of the 72 hour period.

TABLE VII. Average Weight of Ice Required to Maintain Three Methods of Retail Vegetable Display Over A 72 Hour Period. Pounds of Ice Per 6 Ft. Display[1]

Hours	Refrigerated Channel*	Channel Ice*	Snow Ice
0	30.9	33.8	270.0
24	77.0	138.8	221.8
48	93.4	139.6	162.3
72	82.1	131.6	81.0
Total	283.4	443.8	735.1
Average	94.5	147.9	245.0

*Three channels, spaced 18-24 inches apart.

[1]Least Significant Difference

	99% level	95% level
Between treatments	18.00	6.94
Times Between Readings	18.00	6.94

Summary

1 — Spacing ice channels 18-24 inches apart in fresh vegetable retail displays is recommended if a channel ice display is used. These spacings provided ample humidity, temperatures from 40-45 F, and retained 92-94 percent of the weight of the saleable product over the 72 hour test period.

2 — Dispersement of ice channels throughout the display, in direct contact with vegetables, proved more efficient than bunker channels located at ends of the display and exposed only on one side to adjoining vegetables.

3 — No significant differences resulted between the refrigerated sprinkled, refrigerated channel, channel ice and snow ice methods of vegetable display as far as the amount of original product retained was concerned.

4 — A comparison of the amounts of ice required showed that the refrigerated channel required 95 lb/day, the channel ice 148 lb/day; the snow ice case 245 lb/day. Vegetables were left on displays for the entire 72 hour test period.

5 — Average man hours required to sprinkle, garnish, reice, and prepare for overnight storage of the four methods of display were refrigerated sprinkled three minutes/6 ft display/24 hours, refrigerated channel, 14 minutes/6 ft display/24 hours; channel ice 15½ minutes/6 ft/24 hours; snow ice 16 minutes/6 ft/24 hours.

6 — Average temperatures maintained by the four methods of display were refrigerated sprinkled, 47 F; refrigerated channel, 42 F; ice channel, 45 F; snow ice, 45 F.

7 — The addition of ice channels to a gravity type refrigerated case was not advantageous as compared to a gravity type refrigerated case sprinkled with cold water.

Ice Vendor Installed At Gas Service Station

THE first coin-operated ice vending machine in Wilmington, Delaware, was placed in operation recently with the opening of the Concord Pike Diamond Gulf Service Station in suburban Fairfax. The unit is designed to dispense 25-pound blocks of ice, or bags of either crushed or cubed ice. Any combination of coins bring the desired type of ice sliding onto one of three receiving platforms.

The new vending machine is in the service station's parking lot so that motorists have easy access to it. It operates on a 24-hour basis, is lighted at night. The unit was installed and will be serviced by the Diamond Ice & Coal Company.

Missouri Ice Plant Sold

PURCHASE of The Home Ice & Fuel Company, Poplar Bluff, Mo., has been announced by the Hanks Ice & Fuel Company, Fred Hanks, president. Mr. Hanks said both plants would continue in operation, at least for the present.

Southwestern Ice Annual Convention

THE sixty-third annual convention of the Southwestern Ice Manufacturer's Association was held at the Baker Hotel, Mineral Wells, Texas, February 17-19. Registrations were in excess of two hundred, being the largest since the war days. Displays by associate members also were larger in number. The business sessions and discussions reflected concern with the problems confronting management, but the spirit of the convention was one of confidence and assurance.

Officers

Officers elected for the ensuing year were

President, E. W. Franke, Corpus Christi.

Vice-presidents, E. E. Irwin, Columbus; Frank B. Alderdice, Dallas.

Treasurer, Jacob Irvine, Dallas.

Directors: Joe W. Dawley, Dallas; J. B. Hayes, Jr., Marshall; Obert K. Irvine, Dallas; Carl Nessler, Jr., Texas City; Crawford Scott, Gatesville.

Allen Guinn, manager, Texas Power & Light Company, Mineral Wells, Texas, an old-timer in the ice business, who attended his first Southwestern Convention in 1917, welcomed the convention, reciting much of the history of the Association.

President's Report

In his annual report President Stephens emphasized that management is leadership applied to one operation. Industry leadership and the association he said begin to be of constructive service when they face up to the facts that make the day-to-day and season-to-season business life of management.

He reviewed the various activities of the Association, pointing to the values of the conventions, to the engineers' conferences, the merchandising conferences, the management conferences, and the individual assistance that the staff are ever ready to render the members.

Guy W. Jacobs, Executive Secretary, National Association of Ice Industries, gave a comprehensive report of the activities of the National Association, very much along the lines that he reported to the National Convention in Washington in November. He reported that while tonnage had shown some decrease throughout the industry during the last year, realization on the whole had been satisfactory. The spirit of the industry, as he judged it, is that both the present and the future market for ice is such as to afford, through active management, immediate and satisfactory profit and promise for the future that is comparable to other industries.

Col. Sam G. Elliott of the Inspector General's Department, now located at Headquarters' Fourth Army in Fort Sam Houston, Texas, who was in Korea during the hard fighting and precarious days of the Pusan perimeter in the early weeks of the Korean War, gave a graphic account of that experience.

C. P. Austin gave to the association another of his factual and comprehensive reports upon profitable developments of today's ice market. As Director of Research and Marketing of the National Associaton of Ice Industries, M. Austin is a leader in development of profitable outlets on today's ice market.

Session on Marketing

An open forum session on marketing was directed by E. W. Franke. An interesting contribution of this session was a report from A & M College of Texas, of the interest the college is taking in the development of new peach growing areas with improved types of fruit and the accompanying interest in hydro-cooling.

The entertainment features of the convention included an opening cocktail party, a tea for the ladies, and the President's banquet and dance.

Final Session

The final session was featured by an open forum discussion of managerial problems and was directed by W. C. Stevens. This discussion was devoted mostly to problems of interior management dealing with labor relations and with other policies and leading to satisfactory and profitable operation.

Andres Closes

The convention was brought to a fitting close with an address by Paul H. Andres, president of the National Association of Ice Industries. Mr. Andres discussed the favorable aspects of ice sales over the past few years and listed the agencies that have been opened up for increased sales of ice. Some ice distributors, he said, may not be able to ring the bell on all these possibilities, but he suggested that they give it a good try.

Northwest Ice Association Annual Convention

THE annual convention of the Northwest Association of Ice Industries held March 25 and 26 at Yakima, Wash. had an interesting program for ice men of the Northwest.

There are still plenty of markets for ice if ice men will take the trouble to look for them, said Thomas B. Gilliam of San Francisco. Poultry processing, vegetable cooling, and field cooling of fruits and vegetables, he mentioned as new usages which will help to increase the total tonnage of ice sales.

Harold E. Wersen, safety engineer, said that safety efforts in the ice industry have paid off. But consistent effort, he warned, is necessary to keep accidents down to a minimum.

Crop prices are a governing factor of ice consumption, William L. Burns of Yakima said. When prices are good the shipper uses more ice because he can see a break-even point. When prices are down he uses less ice as the break-even margin becomes smaller. The ice vending station is an important factor because it makes ice available at less cost than home delivery.

The convention was concluded with a banquet at the Hotel Chinook.

Officers were elected for the coming year as follows:

President, S. W. Garvin, Vancouver, B. C.

Vice-president, William L. Baker, Seattle, Wash.

Secretary-treasurer. William L. Burns, Yakima, Wash.

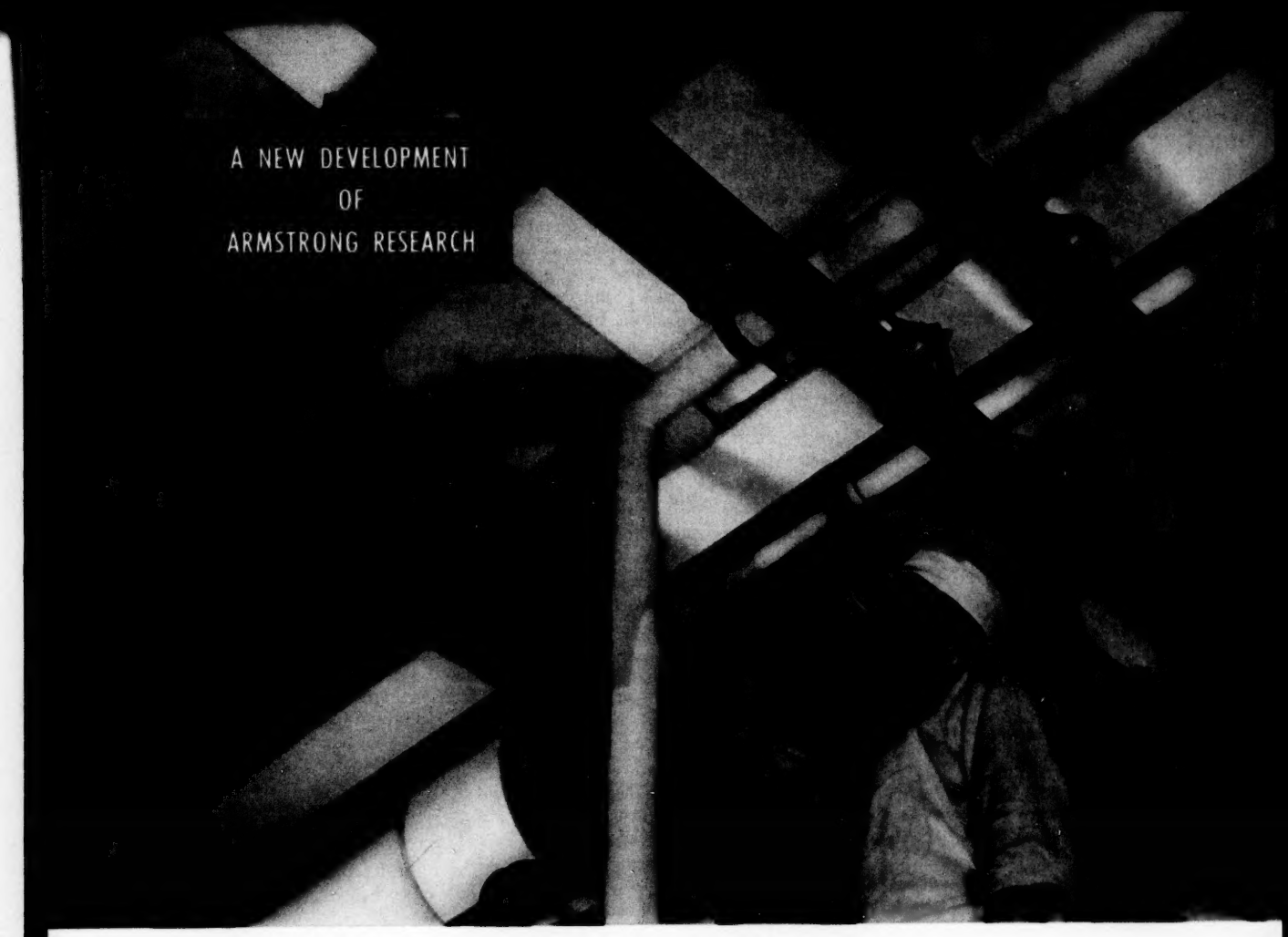
Executive Secretary, L. F. Marsh, Portland, Ore.

Colorado Ice Company Awards Service Pins

VETERAN employees of the Colorado Ice & Cold Storage Co., Denver, Colo. were given length-of-service pins by the company at a banquet at the Park Lane hotel. In all, 850 years of service with the firm were honored. Presiding were Frank W. Adams, president, and L. L. Baker, general manager.

Fire Damages Ice Plant

THE City Ice and Coal plant, Scottsboro, Alabama, was destroyed in a fire causing a loss estimated at $20,000. Local firemen hampered by freezing weather fought the blaze for five hours. The cause was not determined.



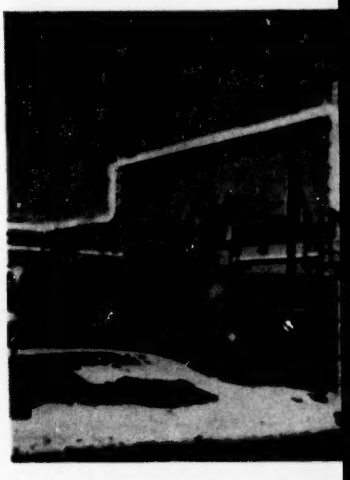
Insulcolor . . . *a new plastic finish for insulated lines, tanks, ducts, and cold rooms*

Here's a new kind of insulation finish that also serves as color identification. It's Armstrong's Insulcolor, a newly developed plastic coating for use on high- and low-temperature installations in either indoor or outdoor locations.

Armstrong's Insulcolor dries to a smooth, attractive finish that is rugged and durable. It will withstand a wide range of temperatures without cracking or crazing. Insulcolor is both fire and moisture resistant, easy to maintain.

It is quickly and easily applied, eliminating many of the steps required with standard finishing methods. Available in a choice of seven colors and white, Armstrong's Insulcolor cuts the expense of additional painting of insulation surfaces for identification or decoration.

Insulcolor is another example of ways Armstrong's research is developing insulation materials and methods that simplify application, reduce costs. For full details on Insulcolor and Armstrong's Complete Contract Service, call your nearest Armstrong office or write Armstrong Cork Company, 201 Stratton St., Lancaster, Pennsylvania.



Insulcolor's rugged properties give it the durability needed to withstand severe outdoor service. In the photo above, white Insulcolor has been applied to an overhead line at one of the plants of E. I. du Pont de Nemours and Company, Inc.

ARMSTRONG'S INDUSTRIAL INSULATIONS

The Future of Frozen Orange Juice—Fresh Fruit Supplies Increase

AN examination of the orange situation in Florida, where a million young trees came into bearing during the current season and where three million more will start to bear during the next three years, makes it apparent that there will be plenty of oranges in that state the next few years for use in making frozen orange juice.

Increased Production

In a study made by Continental Can Co., it is predicted that the Florida orange crop will total 104 million boxes by the 1956-57 season, compared to 86 million this season (estimate by USDA, Feb. 1, 1954). This increase would be due mainly to the greater number of bearing trees in the state (25.4 million in 1956-57, as against 22.3 million now) but to some extent to the increased yield per tree. With the exception of a poor season now and then, the Florida yield has been increasing steadily because of improved farming methods. In the 1949-50 season, for example, yield was only three boxes per tree. This year it is expected to be 3.85 boxes and Continental's research men expect the 1956-57 yield to be up to 4.11.

The problem that worries the Florida growers is how the extra 18 million boxes will be marketed three years from now. Little help is expected from the other two marketing branches of the trade. Fresh sales have been fairly constant for the last few years at around the 24 to 26 million box level and it is doubtful if this branch of the trade can absorb more than 26 million boxes in 1956-57. The single strength canners are not expected to do even as well as in past years; they probably will be unable to take more than 12 million boxes in 1956-57.

Big Increase for Contractors

Thus, barring a bad crop year, which does occur now and then, it can be forecast that the Florida concentrators will be asked to absorb 63 million boxes of oranges three years from now, in comparison with their estimated 47-million-box share of the current crop. Translated into terms of concentrated juice, this would mean a Florida pack in 1956-57 of 80 million gallons, compared to 46.6 million gallons last year and an estimated possible pack of 63.4 million gallons this season. To this, of course, must be added the California pack. In recent years this has been running around 3.5 million gallons. But it probably will be no more than 2.5 million gallons both in 1953-54 and in 1956-57, because of a poor Valencia crop this season and because of a continuing decline in California acreage for the three-year pull. This would add up to a possible national pack of 65.9 million gallons this season and 90.5 million gallons in '56-57.

Consumption Record

Can the market absorb that much orange juice? Certainly, the past record is encouraging, as shown by the following tabulation.

	Consumption (Millions of Gallons)	Percent Increase Over Preceding Year
1950-51	30.0	50
1951-52	46.3	55
1952-53	53.6	16

As can be seen, the increases were large up to the past season when a gain of only 16 percent was registered over the preceding year. But 1952-53 wasn't a normal sales year. Supplies were short and prices were high. Even so, during the first months of the current pack year with supplies once more plentiful and with declining prices, the percentage gain over the year before were running even less than last season, around 10 percent.

Sales Increase Needed

In any event, it may be shown arithmetically that if the 104 million box estimate for the 1956-57 crop is correct and if bad crop years don't interfere too seriously with the flow of supplies, then the frozen food industry will have to sell 14 percent more concentrate this season than last and will have to repeat the performance during each of the following three years to keep abreast of the predicted crop gains, tabulated as follows:

	Consumption (Millions of Gallons)	Percent Increase over Preceding Year
1953-54	61.1	14
1954-55	69.6	14
1955-56	79.4	14
1956-57	90.5	14

Naturally, it is still too early to know the score. One prediction that would seem to be safe, however, is that the concentrators won't run short of oranges again, for a few years anyway.

A marketing study by the National Wholesale Frozen Food Distributors Association

Egg Washing On Way Out

THE Management and Board of Poultry Producers of Central California, Giant-Size Producers Coop. are now convinced after three years' experience with a program, (first a premium for unwashed and then a penalty for washed) that their goal is complete exclusion of washed eggs from the PPCC packs. The board had adopted resolution of policy that beginning March 1, 1954, egg producers will be accepted as new members only on condition that they deliver unwashed eggs.

This action is not considered to be drastic, it is only protection and extension of a program that has proved itself. Receipts of unwashed eggs have climbed above the 90 percent level and have held the high level. The next step is only logical and, of course, good business.—TRRF Bulletin.

Frozen Concentrated Apple Juice

THE question whether apples can go to market as frozen concentrated juice is still under consideration in the research centers. USDA has reported a consumer test in New York City, conducted by two volunteer department stores, in which 379 customers reported taste reactions to super-concentrate (reduced 6 to 1) in comparison with conventional bottled juice. The customers voted 3 to 2 in favor of the reconstituted concentrate. Both juices had been made from a mixture of four varieties, including McIntosh. Essence and juice had been separated and concentrated separately and then mixed.—TRRF Bulletin.

Ohio Ice Association Annual Convention

THE annual convention of The Ohio Association of Ice Industries held at Columbus, Ohio, February 22-23 was used largely for open panel discussions. The convention attendance was good and it was highly gratifying to note that a number of "first-timers" were present.

Jack Whitelock of Warren acted as moderator for each of the two panel sessions. He and his panel of experts did a good job of answering the questions that were asked of them and their discussions brought forth lively participation from those in attendance. Many worth-while ideas and valuable experiences were exchanged throughout the meetings. The delegates like the privilege of being a part of the program, too. Everyone present at the convention was seated around U-shaped tables which was an ideal arrangement for this type of meeting.

Preceding the first forum meeting at the Monday session, C. P. Austin of the National Association of Ice Industries made a very comprehensive report on research and marketing within the ice industry. He also served as a panel member of both forums.

Selling was the theme of the first forum, and the discussions under this general heading covered such topics as marketing methods, new outlets for processed ice, domestic and commercial deliveries, vending station operations, etc.

At the final session Tuesday, G. P. Bush, chairman of the Safety Committee, presented the customary and very handsome awards to the winners in each of the three groups of the state-wide safety campaign. The winner in Group A—plants with 1 to 7 employees—was The Citizens Ice & Coal Company, Sidney; in group B—plants with 8 to 20 employees—The Leichner & Jordan Company, Portsmouth; and in Group C—plants with over 20 employees—The Service Delivery Company of Akron was the winner.

Guy W. Jacobs, Executive Secretary of the National Association of Ice Industries, gave a most informative report on the activities of that organization.

At the second forum session held Tuesday, the subject of production provoked many interesting discussions on ice plant management and equipment, labor problems, power costs, winter operation, ice handling procedures, etc.

The entertainment features were up to the usual high standard set by the Association in the past and everybody seemed to enjoy the social features as well as the business sessions of the convention.

Immediately following adjournment of the convention the new Board organized by electing the following officers for the ensuing year:

President, Jack Whitelock, Warren

Vice-president, James S. Boardman, Columbus

Secretary-treasurer, Elizabeth Shannon, Steubenville

Previously the convention elected the following additional directors: Wm. H. Adams, Dayton; W. B. Blessman, Akron; E. J. Dager, Bucyrus.

Mountain States Spring Conference

A SPRING conference will be held by The Mountain States Association of Ice Industries Friday and Saturday, May 14 and 15 at the Brown Palace Hotel, Denver, Colorado. A very interesting program built around the round table type of conference is planned and very good attendance is expected.

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Snow-icing with a LINK-BELT Ice Crusher-Slinger opens new markets for you!

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Link-Belt Ice Crusher-Slingers are available in either stationary or portable types with gasoline engines or electric motors. Capacities from 15 to 60 tons per hour. If you want to build profits in the ice service business, ask your nearest Link-Belt office about the Ice Crusher-Slinger. Or write for Book 2382.

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National Stock Yards....Bridge 1220
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Baltimore, Md.....Saratoga 1900
Boston, Mass.....GA 7-8110
Worcester, Mass....2-5633-4-5-6-7-8
Detroit, Mich.....Woodward 1-3502
Minneapolis, Minn.....AT-4501-8
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St. Louis, Mo.....Main 3600
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Sherwood 2-8040-1-2-3-4
Brooklyn, N.Y.....EV 7-3900
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New York City, N.Y...Longacre 4-5955
Rochester, N. Y.....Locust 3570
Syracuse, N. Y.....76-5391
Yonkers, N. Y.....Y-5-4422-3-4
Charlotte, N. C.....3-5152-3-4
Cincinnati, Ohio.....Cherry 1333
Cleveland, Ohio.....Endicott 1-1160
Columbus, Ohio.....Garfield 2161
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Oklahoma City, Okla.....79-2531
Tulsa, Okla.....37151-2-3
Portland, Ore.....Twinoaks 1151
Philadelphia, Penna....Poplar 5-0100
Pittsburgh, Penna.....Hemlock 1-1200
Pittsburgh Prov. & Packing Co., Penna.....GR 1-2460
Providence, R. I.....EL 1-1400
Chattanooga, Tenn.....6-4725
Knoxville, Tenn.....3-5135-6
Memphis, Tenn.....5-4311
Amarillo, Tex.....6-5246
Corpus Christi, Tex.....6-5246
Dallas, Tex.....Edgemont 2-3735
El Paso, Tex.....3-3621
Fort Worth, Tex.....Market 2101
Harlingen, Tex.....2050
Houston, Tex.....Capitol 1175-5
Lubbock, Tex.....5596
San Antonio, Tex.....Garfield 5321
Richmond, Va.....3-1876
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Charleston, W. Va.....27-165
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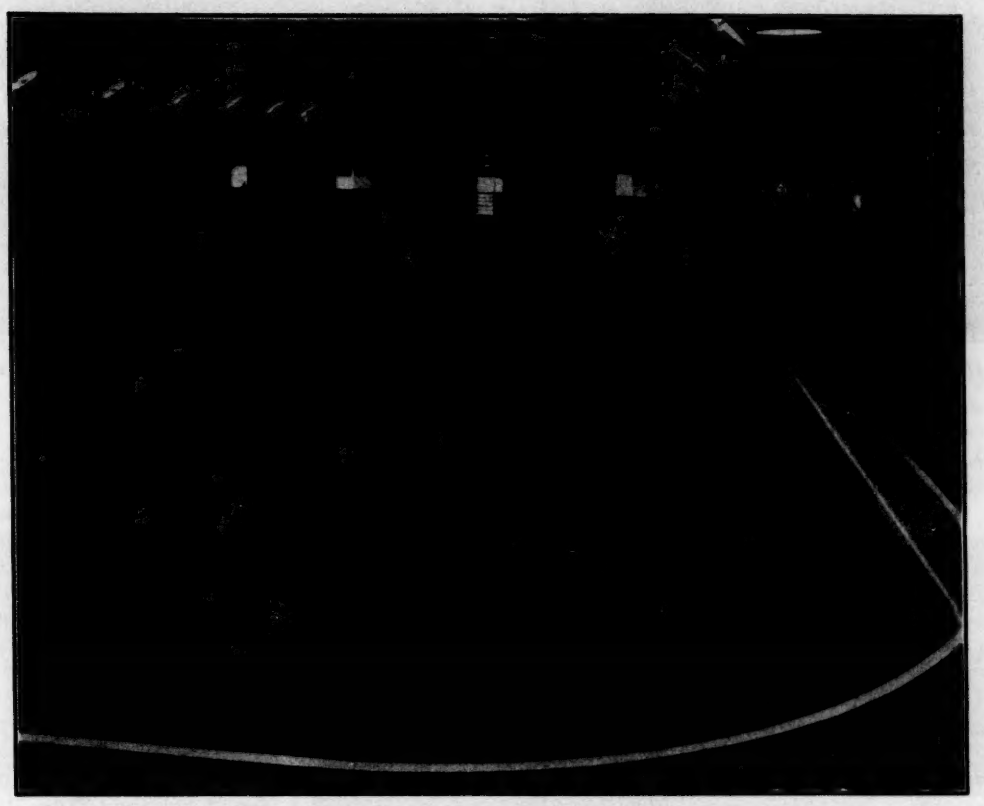
AGENTS

Indianapolis, Ind.: A. Hoffman Co. State Life Building....Market 8666

Nashville, Tenn.: Sanders, Inc. 712 8th Ave., S.....6-7111

Tampa, Fla.: C. Scott Johnson 3502 Nebraska Ave.....2-1495

Modern Ice Hockey Rink at Dartmouth Enlarges Field of Winter Sports for Students



Interior view of Dartmouth College's Davis Ice Rink after installation of an artificial freezing system. Spang steel pipe, four inches apart, circulate the refrigerant.

WHEN the Dartmouth College ice hockey team practiced for its game with Harvard recently, nobody had to worry about the weather. The players knew that even if Hanover, N. H., should have a warm spell, the game could be played as scheduled, on a firm, smooth ice surface. That represented a great improvement over conditions in previous seasons, when the Davis Rink was dependent on natural ice. "On many occasions", College authorities recall, "mild weather turned the rink into a veritable swimming pool." Nearly one-quarter of the home games and an even greater number of practice sessions had to be cancelled. Now, regardless of outdoor temperatures, there is no problem. The rink has been converted to an artificial ice system.

The installation of this rink is part of a general trend which is now being felt throughout the schools and colleges of the country. The school authorities are realizing that something should be done to provide athletic and recreation facilities for the average student. The old system provided a magnificent stadium, perhaps serving thousands of spectators, but the men on the team numbered less than 50. Now, the rink at Dartmouth, it is reported, attracts more people for practice than formely attended the games.

Dartmouth College now joins with other Eastern Colleges in providing an ice surface that can be kept permanently frozen for months at a time. At the Taft School the rink is in use from Thanksgiving until March. Curling rinks are being built for the same reason. A fine curling rink was erected at Schenectady, New York, in 1952.

Pennsylvania State University, realizing the importance of this trend, has placed an order for a very large rink, to measure 200 by 100 feet, with the possibility of adding 50 more feet when needed. This will accommodate 800 students. The rink will be out of doors, and will be refrigerated with two 10 by 10 ammonia compressors, through the medium of cold brine, as is used in most of the others.

On the West Coast the Independent Refrigerating Company has lately completed a rink for the Jerry Page Ice Skating Studio. This measures 60 ft. by 26 ft. and is believed to be the largest skating studio of its kind in the world. It is located in Los Angeles.

Making artificial ice at Dartmouth, renowned for winter sports, may sound akin to "carrying coals to Newcastle", but the fact seems firmly

These refrigerating machine supply refrigeration for Dartmouth skating rink.

Coaches and players try out newly formed ice surfaces in Dartmouth skating rink.

established that recent winters are milder than those back in 1929 when the rink building was erected. At that time, Hanover weather, combined with the insulation provided in the rink, was sufficient to maintain an ice surface from early winter well into March. But in the 1952-53 season, the Dartmouth players didn't get into Davis Rink until after Christmas.

The New Dartmouth Rink

The new system, made possible by contributions of alumni and friends, includes more than ten miles of steel pipe in which brine is circulated, as well as machinery for circulating this refrigerant. Trumbull-Nelson Co., Inc., of Hanover, served as the general contractor. Frick Co., Waynesboro, Pa., was responsible for the overall engineering work and installation of the freezing system. The pipe was manufactured by the Spang-Chalfant Division of The National Supply Co., Pittsburgh.

Rink Floor

The rink floor measures 188 feet 8 inches, by 85 feet 6 inches. Cold brine from the refrigerating plant is pumped through the pipes under pressure, thoroughly chilling the sand fill and overlay. Water is then sprayed over the sand, and freezes almost immediately on contact with it. The 1-inch extra-heavy Spang pipe is welded together into 128 sets, each of which extends the length of the floor, then loops and returns

Brine Cooler and Pumps in Dartmouth Installation.

to the starting end. The pipe is laid on 4-inch centers. The brine feed and return headers, of 5-inch diameter, are all located at one end of the rink. Suitable loops are provided in the headers to equalize the flow of brine through the pipe.

Refrigeration Load

The refrigerating load is carried by two Frick 7 × 7-inch ammonia compressors. These machines are connected to a brine cooler of the shell-and-tube type. The condenser is of the evaporative type and is located in the engine room as a protection against freezing.

Complete automatic controls are an important feature of the installation. The compressors are equipped with starting unloaders, oil pressure safety switches, cylinder wall thermostats, automatic jacket water valves, and high and low pressure cutouts. The fans and pumps on the evaporative condenser have individual controls. Time delay switches prevent the compressors from starting until after the condenser is in operation. Frick electric control and float valves regulate the feed of ammonia to the brine cooler, which is equipped with a close-differential thermostat. A brine pressure failure switch prevents freezing of the cooler.

Terminal Refrigerating Adds Freezer Plant

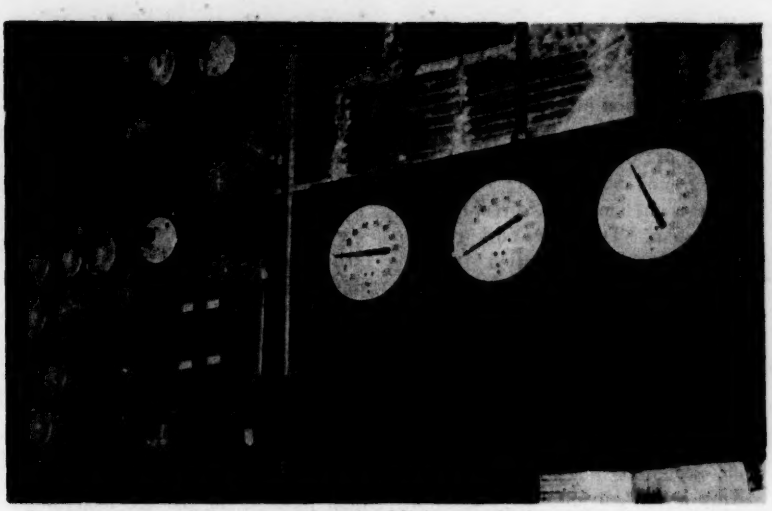
CONSTRUCTION was started early in March by Terminal Refrigerating Company of Los Angeles of an 800,000 cubic-foot freezer plant. The cost of the project, including land, building and equipment has been announced at $1,000,000. The new plant will be near the junction of the Hollywood, Arroyo Seco, Santa Ana, Harbor and Ramona Freeways, and will be served by the Union Pacific Railroad.

The structure will feature reinforced concrete walls with a roof system of wood joists and wood diaphragm supporting the ceiling insulation, and covered with five layers of composition roofing and a layer of crushed rock.

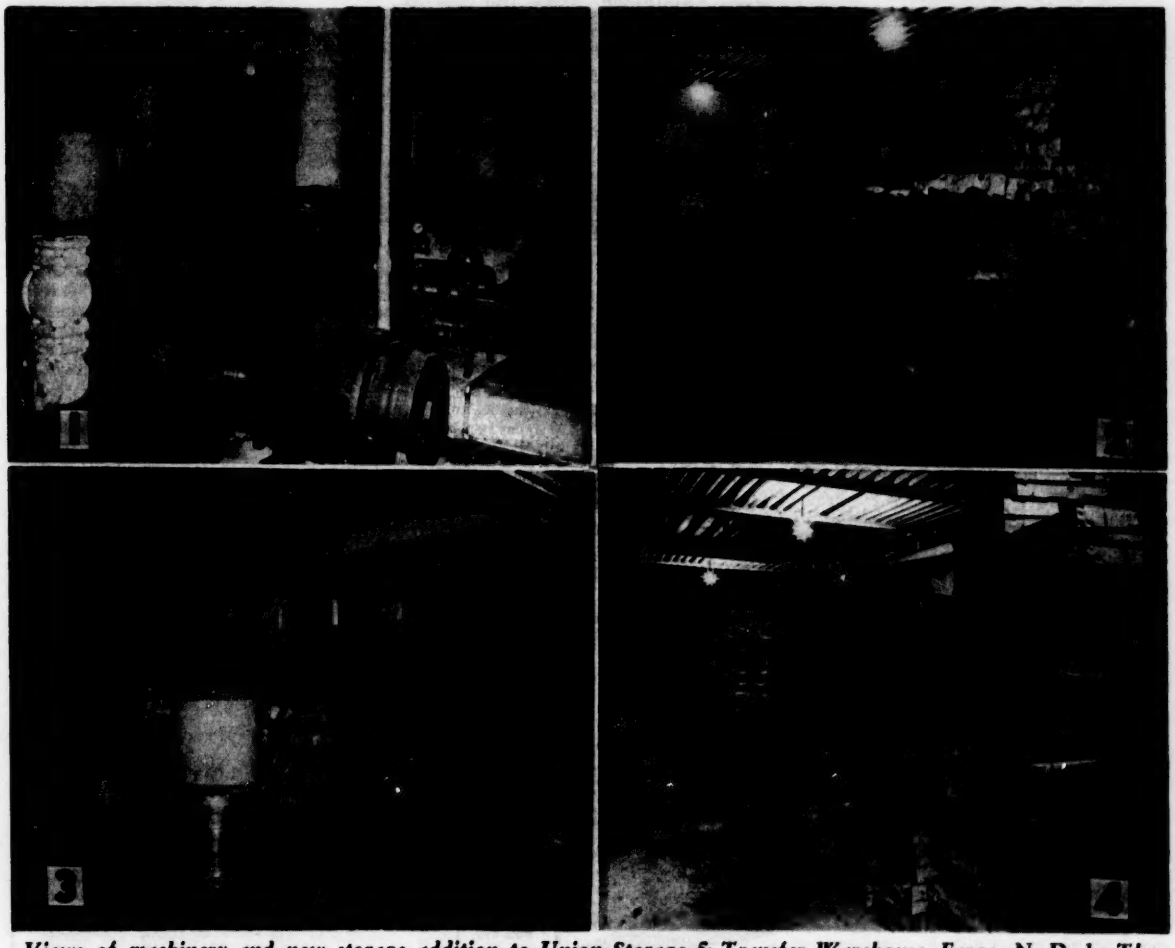
The new plant will function as a reserve bank for retail pack frozen foods, serving distributors, chain stores and the frozen food industry throughout Southern California and Arizona, Harlan J. Nissen, vice-president of Terminal Refrigerating Company, announced. It is planned, Nissen disclosed, as the first unit of three ultimately to be constructed at the new location.

Addition and New Machinery Provide For More Freezer And Storage Space

INCREASING demand for quick freezing service and storage space has been met by the Union Storage & Transfer Company, Fargo, N.D., with addition of machinery, adding 50 percent to its former capacity and bringing total storage space to 373,820 cubic feet. One of the big factors leading to this expansion according to G. L. Bertel, president, is the increasing practice of evisceration of turkeys and other poultry in that section.



Instrument panel in new storage addition to Union Transfer & Storage. On the right, left to right: High temperature suction gauge; Low temperature suction gauge; Discharge pressure gauge. Top left: Indicator lamps on brine control system. Left, top row: Ammonia liquid pump controls; Ammonia low pressure receiver indicator; Intercooler. Below: Indicator pair. Alarms, connected with east and west blast freezers. Lower left: Indicators for sweet water cooler and intercooler.



Views of machinery and new storage addition to Union Storage & Transfer Warehouse, Fargo, N. D. 1—The two new York rotary compressors. 2—A view of new storage room. 3—One of the two new blast freezers. 4—Another view of storage room

Illustrated below are views of the new storage floor with a gross area of 100 x 115 feet. It is insulated with eight to ten inches of cork. Two blast freezers also were added with capacity of 30 tons per day at minus 30 to minus 50 F.

This is an ammonia direct-expansion system. Two new York rotary compressors were installed in the machine room with 90 tons capacity, and minus 40 F for low side operation. This was in addition to three York compressors for the high side and one 50-ton Vilter compressor for the low side.

Controls

This is not an automatically controlled setup, but the plant is equipped with instruments which sound alarms for various situations that may arise. The panel from which these Gage-O-Matic instruments are controlled is shown in top right corner of picture of the engine room, also a closeup on previous page. These are indicating controls on the accumulators and inter-coolers and low pressure receivers. These controls operate magnetic valves to maintain the liquid levels. If one of these valves fail, the liquid level rises, setting off an alarm and lights on the panel come on indicating which accumulator needs attention. Should the liquid level continue to rise to the point where there is danger of letting liquid back to the compressor, this gauge or alarm instrument will shut down the compressor until the situation is corrected.

Butter Conversion

THE U. S. Department of Agriculture has asked for offers to convert 1,150,000 pounds of USDA-owned butter into butter oil for human food in the Middle East under a United Nations program. The purchase cost to U. N. for the butter oil will defray only USDA processing and transportation costs.

The USDA also announced that 30,000 pounds of butter has been sold to the Deran Confectionery Co., Inc., Cambridge, Mass., for use as cocoa butter extender. The price was 25 cents per pound. This sale brings the total butter sold under the cocoa butter extender program to 300,000 pounds.

Vacuum Cooling versus Ice Packed Lettuce

THE Handling, Transportation and Storage Division of Agricultural Research Service, USDA, Plant Industry Station, Beltsville, Md., has compared vacuum with ice cooling for lettuce on the basis of storage life and has issued a report on the subject.

After a transit period of 8 to 13 days, 25 days' storage at 33 F or 16 days at 38 F would probably be too long for lettuce that must then move through wholesale and retail channels; however, enough edible lettuce would probably be recovered after trimming to make it worth while for ships' stores or commissary purposes. Except for more bruising in ice-packed and slight wilting in vacuum-cooled, differences in appearance, decay, edible portion and salability of the two types were slight.—TRRF Bulletin.

Permit For New Warehouse

BUILDING permit has been issued to the Andrews Cold Storage Company, Prosser, Wash., for construction of a new concrete warehouse to cost $15,000.

Convince Yourself at Our Expense

how TEMPLETS make ice clearer stronger and faster

TEMPLETS are an old reliable product that aid in making ice clearer, stronger, and faster. For many, many years thousands of raw water ice plants throughout the country have used them continuously with complete satisfaction. Their purpose is to produce ice that is clearer and stronger, rapidly. Their use in production leaves no taste, no odor, no color, and their cost is economical.

To the ice manufacturer who has never used TEMPLETS we will be happy to send samples for his own testing, absolutely FREE and without any obligation whatsoever. What could be more liberal?

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Departmental Cooperation for Hotel Operations

Examination of Costs and Savings to be Made in Electricity, Gas, Water and Heating Fuel

ERICH B. UTESCHER
Supervising Chief Engineer
The Kirkeby Hotels

COOPERATION with the engineering or mechanical department is essential for the proper operation of a hotel. And, of course, it is likewise most essential that the engineering department cooperates with all other departments, in effecting substantial savings for the hotel.

The lack of knowledge that the average hotel employee has in regard to the actual functions and responsibilities of the engineering department is surprising. Here is a department that can save a great deal of money for other department heads, with a little cooperation. In the kitchen, the chef can cooperate by reporting steam, hot and cold water leaks, gas leaks, etc. If these leaks are permitted to continue, it would not be long before many dollars would go into the sewer or into the air, completely lost (see Fig. 1). The same can be said for captains, head waiters or waitresses. By reporting leaky faucets or valves in the service pantries they assist their own and the engineering department.

In many hotels, one will find that the chef, steward or captain of waiters does not get along very well with the engineer or maintenance men. Whether it is because certain repairs are not made immediately when they call up, or because the engineers are continually complaining that the kitchen employees are wasting steam, electric current, water or gas, for which the engineering department is held responsible, is hard to determine. I know of some hotels also where the housekeeper is not on speaking terms with the engineer. And mind you, it is for no other reason than those just mentioned. Delays, misunderstandings and a general confusion in the carrying out of orders, all contribute to this lack of cooperation.

The Architectural Forum Magazine recently published an article in which it stated: "Erich B. Utescher, supervising chief engineer, Kirkeby Hotels, directs the chain's multi-million dollar modernization and remodeling program. His 'yes' or 'no' can make or break the sale of building materials and equipment to any one of the 11 Kirkeby Hotels in nine cities." Mr. Utescher is a past president of NAPRE and active as its Publications Chairman. When the 44th Convention met at Purdue last fall he was appearing before the Kirkeby chain hotel managers convention. The articles presented here are condensed versions of two of his papers to that group, in which he presents his views on departmental cooperation and air conditioning.

Department heads, as far as our bosses or managers are concerned, are all equal, and there should not be any feeling that one job is more important than another. Every department is important to the smooth, economical operation of the hotel. Some department heads have good ideas on ways and means to save money in their respective departments through cooperation with the engineering department, but they never carry out their ideas due to friction with one another. It has, moreover, become a practice to show a saving in the respective departments, regardless of expenses, so that cooperation is not thought of as a sure means to reach this desired end, and to show a realistic profit.

Cooperation is Income

The savings made in the proper application of cooperation between the departments are actually income to the hotel. If certain savings can be made that otherwise would come under the head of expenses, then these same savings can be looked upon as income. For example, if the kitchen has been operating without being charged with floor space occupied, water, gas, electric current, refrigeration, mechanical repairs and replacement to equipment, etc., then the kitchen can easily show a very good profit. If the kitchen is directly charged for these items, then the profit shown is reduced.

It stands to reason, then, if savings are made in the use of the utilities in the kitchen, and possibly modern new equipment installed that will bring additional efficiency and savings, then the income of the kitchen can be greatly increased. These savings can amount to a great deal if the kitchen employees remember to shut off lights when not in use, to shut off faucets, to shut off ventilating fans when not useful, shut off valves on steam heating and dish warmer cabinets when not necessary, discontinue gas ranges when standing by, and so forth.

Utilities to Income Ratio

Here's a few pertinent facts to remember. Water costs one and one-half percent of room income! Electricity is the largest item of our

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Secretary, J. R. Kelahan, Chicago 44.

Operating engineers of all refrigerating plants are invited to affiliate with the National Association of Practical Refrigerating Engineers, an educational association.

COST ANALYSIS OF AN ACTUAL SURVEY MADE ON A
LEAKY HOT WATER FAUCET
(BASIN BATH ROOM)
IN ONE OF OUR HOTEL GUEST ROOMS
By E.B UTESCHER S.C.E. KIRKEBY HOTELS
Measured Flow of Hot Water Leak .48 Pint per 250 Seconds
Estimated Temperature of Hot Water 140° Degree Farenheit
" " Before Water is Heated 60° " "
Temperature Rise from Cold to Hot 80° " "
Total Flow of Lost Hot Water Per Day 20.7 Gallons
" " " " " " Per Year 7570 "
Heat Required to Heat This Water " " 5,030,000 B.T.U.'s
Cost of Fuel: At 60% Effeciency $0.502
Total Cost of Fuel Per Year $3.81
" " " Water Loss Per Year .51
Total Cost of This One Leak $4.32 PER YEAR PER ROOM
HOW MANY OF SUCH LEAKS DO YOU HAVE?
Check This - It Will Surprise You!
In Addition THIS FAUCET IS BEING SPRUNG
by Some Thrifty Guest Who Despises Waste,
Trying to Turn the Damn Thing Off, and at times means
a New Faucet - Additional Cost Approx. $4.00
Your
HOTEL
LOSES THIS AMOUNT
OF MONEY DUE TO
LEAKAGE
Steam
Water
SIZE OF LEAKS
NO OF LBS WASTED PER MO 100 LBS PRESSURE
TOTAL COST OF WASTE PER MO AT 60¢ PER 1000 LBS
NO OF GALS WASTED PER MO AT 40 LBS PRESSURE
TOTAL COST OF WASTE PER MO AT 15¢ PER 1000 GALS
1/2" • 805,000 $483.00 1,231,000 $192.00
3/8" • 460,000 $276.00 692,400 $108.00
1/4" • 203,000 $121.80 307,700 $48.00
1/8" • 50,500 $30.30 76,900 $12.00
1/16" • 12,750 $7.65 19,200 $3.00
1/32" • 3,175 $1.91 4,800 80¢
REPORT ALL LEAKS TO THE ENGINEER
AND SAVE YOUR HOTEL MONEY
STOP THIS WASTE FROM GOING DOWN THE DRAIN
OR TO THE ATMOSPHERE.

Fig. 1—The cost of neglected steam, hot and cold water, and gas leaks is much greater than most people realize. Housekeepers, maids, kitchen employees and others should immediately report leaks for correction. Accompanying chart shows what one small leak costs per year. Cost of steam and water leakage is shown on adjacent chart.

utility bills — runs about six and one-half percent of our room income! It's essential that electric lamps and enclosed shades are clean; every dollar you spend on lamps, you spend nine dollars operating them!

Meter Utility Services

Metering of water, electric current and gas for other departments would assist the engineering department to ascertain methods by which savings could be made in the use of these services. Measuring by metering these utilities is as important as the weighing of incoming foods and supplies, or as the accounting machines in the front office. The meter gives an exact picture of the use of these services, as allocated to each department; the kitchen, laundry, restaurants, etc. (See Fig. 2).

In the maintenance operations of a large hotel, it is very important for all departments to have a proper and concise understanding of the limitations, as well as the capabilities, of the engineering department. The general routine maintenance jobs run into literally thousands in both numbers and dollars each month. Careful judgment must be exercised by the department to schedule this work in order to take care of the most important jobs first. However, when emergencies arise, even some of these important jobs must wait until maintenance crew has corrected the emergency.

If there is an important changeover to be made in the kitchen ranges, the chef or steward and the engineer should confer on just when this work can be done, how long it will take, and the like, so as not interfere too much with the regular routine of both the kitchen and engineering department. If this is all understood beforehand, both departments can work hand in hand with a minimum of friction. If at all possible, the manager should be brought into the picture so that he, too, will know exactly the procedure of all concerned.

Human Relations Important

Many department heads and employees have no more idea of repair costs or equipment maintenance in their departments than they have of electric current, water, steam, or gas costs that may be used by them every day. Each department head should have a working knowledge of what the items are that contribute to the upkeep expense of his individual department. Without his knowledge he will never have a clear

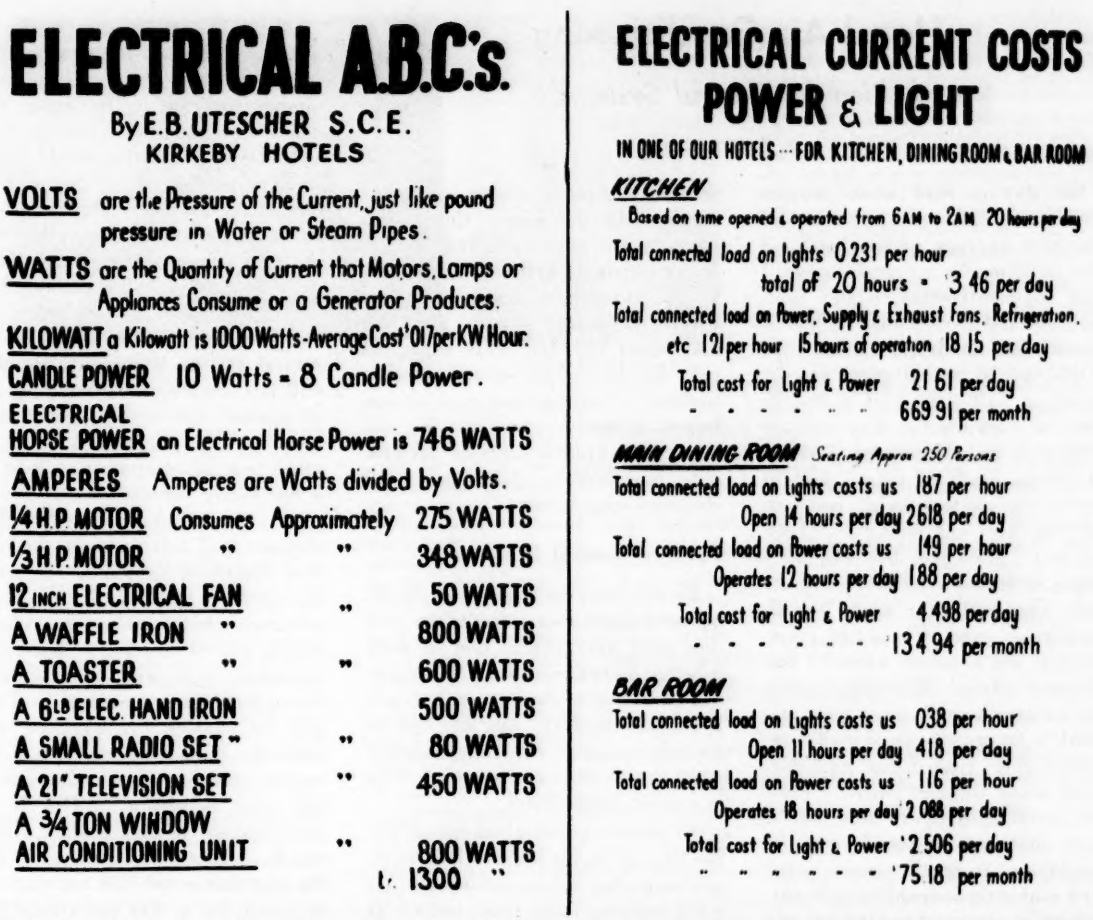

ELECTRICAL A.B.C.'s.
By E.B. UTESCHER S.C.E.
KIRKEBY HOTELS
VOLTS are the Pressure of the Current, just like pound pressure in Water or Steam Pipes.
WATTS are the Quantity of Current that Motors, Lamps or Appliances Consume or a Generator Produces.
KILOWATT a Kilowatt is 1000 Watts - Average Cost 017 per KW Hour.
CANDLE POWER 10 Watts = 8 Candle Power.
ELECTRICAL HORSE POWER an Electrical Horse Power is 746 WATTS
AMPERES Amperes are Watts divided by Volts.
1/4 H.P. MOTOR Consumes Approximately 275 WATTS
1/3 H.P. MOTOR " " 348 WATTS
12 INCH ELECTRICAL FAN " 50 WATTS
A WAFFLE IRON " 800 WATTS
A TOASTER " " 600 WATTS
A 6LB ELEC. HAND IRON 500 WATTS
A SMALL RADIO SET " " 80 WATTS
A 21" TELEVISION SET " 450 WATTS
A 3/4 TON WINDOW AIR CONDITIONING UNIT " 800 WATTS to 1300 "
ELECTRICAL CURRENT COSTS POWER & LIGHT
IN ONE OF OUR HOTELS — FOR KITCHEN, DINING ROOM & BAR ROOM
KITCHEN
Based on time opened & operated from 6 AM to 2 AM 20 hours per day
Total connected load on lights 0 231 per hour
total of 20 hours = 3 46 per day
Total connected load on Power, Supply & Exhaust Fans, Refrigeration, etc 121 per hour 15 hours of operation 18 15 per day
Total cost for Light & Power 21 61 per day
" " " " " " 669 91 per month
MAIN DINING ROOM Seating Approx 250 Persons
Total connected load on Lights costs us 187 per hour
Open 14 hours per day 2618 per day
Total connected load on Power costs us 149 per hour
Operates 12 hours per day 188 per day
Total cost for Light & Power 4 498 per day
" " " " " " 134 94 per month
BAR ROOM
Total connected load on Lights costs us 038 per hour
Open 11 hours per day 418 per day
Total connected load on Power costs us 116 per hour
Operates 18 hours per day 2 088 per day
Total cost for Light & Power 2 506 per day
" " " " " " 75 18 per month

Fig. 2—Electricity is a major expense in any hotel. Charts were prepared so that they will give hotel employees a good understanding of current consumption costs. Electrical terms are explained "comparatively" in order that personnel may associate them with other familiar terms.

picture of what goes on about him. By this it is not meant that each department head should be an engineering expert, but merely acquire a working knowledge which would do him much good.

For example, if a person were connected with the food operations of a hotel, he should know a little about the operations and costs of the dish washers, the silver washing machines, the gas ovens and ranges, the food mixing machines, the refrigeration of foods, and the like. A clearer picture can be then had when he discusses repairs and maintenance with the engineer, manager, or mechanic who is making the repair. If the mechanic gets a proper picture from department personnel on how the machine acted before it broke down, it will be easier for him to locate the trouble.

It is only when all hands stand on a common ground of understanding with fellow workers that they are able to carry out the multitude of small tasks which save money in the operation schedules; when all become familiar with each other's problems. Many of the employees can be encouraged or interested in helping the hotel save money, through a common interest. After all, the human element is still just as important as the machine; and, in many cases, the employee can save as much money for the hotel as can a labor-saving device. The human element is a permanent factor in hotel operation and costs, and improvements can be made to ease the strain on the human element, reduce mistakes and save money for the hotel

An important item to more perfect understanding, is the use of written memos, in place of verbal ones. A written order eliminates confusion and makes an order definite. Verbal orders cannot always be interpreted correctly, or remembered clearly.

In summary, cooperation and understanding between the employee, the department head, and the owner or manager, can result in saving money for the hotel, save worry for the department head, and keep a job open for the employee. The perfect combination is for all to work for one common interest — cooperation!

Boise Cold Storage To Be Remodeled

A BUILDING permit amounting to $40,000 for renovation of the Boise Cold Storage Company building, Boise, Idaho, was issued recently. Floors are being put in a high ceiling portion of the plant to create another floor. This will provide additional space to be leased to Central Eureka Corp., for a boning and freezing plant for boned meat.

Hotel Air Conditioning

A Plea for Central Systems

E. B. UTESCHER

THE day is here when air-conditioning should be standard equipment in every modern hotel and office building. By air-conditioning, I mean summer cooling, winter heating, fresh and recirculated air that is filtered, and humidity control. All of this, as far as the guest is concerned, at just a turn of a dial or a flip of a switch.

There is an old saying "No one can escape death or taxes", and to give it the modern twist, one can add "or air-conditioning". Let's face it — after this last summer's prolonged heat wave, how many requests were made for an air conditioned room, and if you had none, the guest left to go elsewhere? The managers wished that their hotels were air-conditioned, or at least air-cooled. In order to cope with competitors, they rushed out and purchased some window units. They were installed, only to find out a larger electrical service had to be brought up from the main panel board so that these could be operated. The regular electrical service was not large enough for this additional load. That was only the beginning of the headaches for both management and engineering.

Presents Case Against Window Units

As a hotel engineer, I have not been in favor of these window units. From an architectural appearance these projections out of your hotel windows certainly do not help decorate your building. Snow and rain often blow in. Blowing the condensate off the coils into the street on the passing persons doesn't help public relations. They certainly don't enjoy these water drops on them, even though this dripping is harmless. Often some of this condensate runs down the exterior wall, disfiguring the building.

Window washing on the outside is next to impossible with an air cooling unit in the window. Window washing contractors and state or city inspectors will not permit window washer personnel where a window has been equipped with a unit. Consequently these windows are never clean. In the winter these units have to be removed and stored. Many managers prefer to leave them in, but in northern climates I'm sure before the winter is over they will take them out and store them till next season. That creates another problem — storage space — income loss to a hotel. And last but not least, these window units do not provide intermediate operation. All cooling — no heating.

Prefers Central Systems

By this time the impression should be established that I don't like window units very much; that is, until a better design is made. Their one big advantage is the feature that each room is a separate unit and can be started or shut off independently when the room is not occupied. This is a great power saver.

A central system of air-conditioning belongs in the luxury class hotel, and providing air-conditioning to an older building is no small order. It is expensive, costing approximately one thousand dollars per room. Air-conditioning is no novelty. The traveling public knows that it provides comfort and they are demanding it. They expect it. A well-designed system will take some time, thought and money.

A central system that works well for the hotel or business building down the street may be of the wrong design for you. To do it right takes time and study, and every job is different. Each system has its own particular advantage or disadvantage. Each job must be tailored to fit its particular type of building. A good air-conditioing installation provides cooling in the summer, heating in the winter, and humidity control both summer and winter. The central system, if properly installed, will last the life of the building, but, of course, will require good maintenance such as needed with any other type of equipment. It is not a temporary installation.

It is my opinion that many radical changes will be made in the very near future on individual room conditioners to make them more competitive to the central system. Changes will provide cooling or heating as required, and will not protrude through window openings. These will be capable of operation only when the room is occupied, and will not be operating constantly or when the room is vacant. This is the disadvantage of the central system which operates 24 hours each day. An installation of 300 ton capacity designed for a 400 room establishment operating when only 200 rooms are occupied, requires the whole system to cool these 200 rooms. Only half of the entire capacity of the system is utilized, but nevertheless using power, water, wear and tear that could be saved if they were individually controlled.

News Notes and Chapter Activities

Chicago

JOHN FORTI

THE Chicago Chapter meeting of February 23 was set aside for a special event, honoring John W. Neff, chapter past president, national past president and a national honorary member. John was presented with a gift from the chapter consisting of an engraved wallet, identification folder and a key case. The spaghetti and meat ball feed was chefed by president and Mrs. Bert McKenna. Liquid refreshments preceded the dinner, which was followed by dancing. Ladies' prizes went to Mrs. Rudy Carlson and Mrs. Dick Kelahan.

At our March 9 meeting, Bill Richards, H. A. Phillips Company, substituted for Gene Rytlewski, our instructor. The course covered portions of servicing. Bill commented that he felt he learned more himself by instructing, than he was able to teach others. "Wild Bill" Cody was next on the program and entertained with refrigeration experience anecdotes.

On March 23, the chapter was honored by the presence of many members of other chapters who were visiting the Chicago area for the convention of NAPE, and the American Power Conference. Speaker of the evening was John H. Herzog, San Francisco. Other San Francisco visitors were Oscar Peary, San Francisco Brewing Company; Ken McNeely, Dominican College; Sal Gran, Chief Engineer, San Quentin State Penitentiary; Mansfield Garrett and his son, Mansfield, Jr. Chester Watson of Louisiana Chapter No. 2 was also a guest. Pongse Dibavadi, a member-at-large from Thailand was also present.

Non-member guests in attendance were Clifford Hehn and Harry League, both of Cincinnati, who are interested in starting an NAPRE chapter in that city; George

Out of town guests present at March 23 Meeting of Chicago Chapter.

John H. Herzog

Pardee, an NAPRE past president from Louisville, Kentucky; Cease I. Elliott, Carrier Corp.; and O. C. Johnson, Public Works Department, State of California, Sacramento.

Mr. Herzog is chief engineer for San Francisco Brewing Corp., one of the largest breweries west of St. Louis. In his address, the speaker brought out the information that his firm has just completed an 8 year expansion program and has increased their production tenfold. Refrigeration capacity has been doubled, from approximately 500 tons to 1000 tons.

It was interesting to note that production of beer was continued without interruption during this expansion program, creating many more problems and work for the engineer. This brewery is located in the center of San Francisco where property values are quite high; therefore, every inch of space is at a premium. The roof is used to an advantage by supporting water tanks, evaporative condensers, and air compressor inter-coolers.

Two 6-inch mains from the Sierras supply water needs. Water is stored in cone shaped tanks; it is drained from near the tank tops and sludge is drained periodically from bottom of cone, taking some work off the filter system. Mr. Herzog stressed his belief that cleanliness is ninety percent of making good beer.

Five brews are made daily, approximately 800 barrels each. Hot wort is cooled from approximately 200 F to 80 F by water. He stated that 5 gallons of water are used to cool 4 gallons of beer. The water that has been used to cool the wort is reused in the beer-making at 125 F temperature. Excess water is used throughout the plant for washing down, sparging, etc.

Water used for rinsing bottles is filtered and piped to storage tanks on the roof. This water is reused for pasteurizing. Mr. Herzog's records show less than 6 gallons of water used to make one gallon of beer.

The refrigeration system is quite simple in that the complete plant is run on a common suction. All suction lines return into an accumulator and thence to any of six compressors to produce approximately 1000 tons of refrigeration at peak load. Evaporative condensers, equipped with air precooling coils, are used to condense the ammonia.

Seattle

CHET BERTUS

THE meeting March 18 of Seattle Chapter was called to order by President Gil Hickok, following a dinner served at the Y.M.C.A. Correspondence included a letter from the National President, Leo J. Vivien, addressed to Mr. Hickok, congratulating him on his recent advancement to president of the chapter, and also thanking him for accepting additional duties on the Publications Committee.

John Grainnger, chairman, Educational Committee, reported that arrangements were made for a field trip to the power plant at the University of Washington, on April. William R. Bjornstad, Production Department, Sweden Freezer Manufacturing Co., was initiated into the chapter as an active member.

Following the business meeting, Bud Overbye, Seattle branch manager, York Corp., presented a talk on "The Recirculation of Liquid Ammonia". Mr. Overbye had with him a number of drawings, showing various coil arrangements with and without a recirculation system. Mr. Overbye stated that refrigerant recirculating systems have become popular for many applications during the past few years.

He went on to point out that the system had a number of advantages: The surface of the evaporator is constantly covered with liquid refrigerant which increases the heat transfer coefficient; heat transfer is also increased because of the rapid movement of liquid across the surface; of particular benefit in the ammonia system, is the scrubbing action of the excess liquid which tends to prevent oil accumulation on the evaporator surface; the liquid is cooled and the flash gas is taken off in the accumulator before the refrigerant enters the evaporator; the evaporator can operate at a lower temperature difference, or less coil surface can be used for the same capacity. Offsetting these advantages, to some extent, is the cost of the liquid pump and accessories.

Green Bay

JIM SCHOUTEN

AT the meeting of Green Bay Chapter February 17, Gene Rytlewski of Chicago conducted a sample instruction course on fundamentals of refrigeration, touching principally on basic hookup of high and low sides, and pointing out importance of line sizing, oil drainage, etc. Two new men came in from Norway, Michigan, a distance of 100 miles. A total of four new men were signed up.

Green Bay Chapter held its regular monthly meeting Wednesday, March 17, at Beaumont Hotel. Meeting was opened by President A. Vierbicher, who in the absence of the secretary appointed Chas. Culbert to pinch hit. Following the meeting President Vierbicher led a refrigeration discussion and Gus Reinert demonstrated the topics on a blackboard. Hillary Lesperance and H. Liebman, Jr. from Prebel Cold Storage were present as guests. Application for membership was received from Otto Bowling, Shawano.

Colton

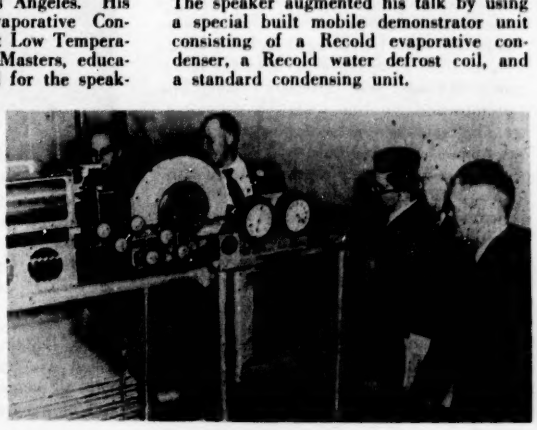
H. O. BONTER

THE March 10 meeting of California Chapter No. 5 was held at the Santa Fe Ice Plant lunch room. After regular business, president T. C. Bangs turned the meeting over to program chairman, C. H. Purkiss, who introduced the speaker, Herb Ray, Shell Oil Co. Mr. Ray gave a short talk, then presented three short motion pictures in color and sound, showing "Refining Oil for Energy", "Liquid Hydraulic Power" and the history of Diesel Engines.

San Francisco

LEWIS BROOKS

AT the February 10 meeting of the California Chapter No. 1, our guest speaker was Harold A. Halls of Refrigerating Engineering Company, Los Angeles. His topic was "Dry Fan Evaporative Condensers, and Water Defrost Low Temperature Evaporators". Dave Masters, educational committee, arranged for the speaker. The program was sponsored by Wyatt R. Brown Company, San Francisco representatives of Refrigerating Engineering. The speaker augmented his talk by using a special built mobile demonstrator unit consisting of a Recold evaporative condenser, a Recold water defrost coil, and a standard condensing unit.



Guest speaker Harold A. Halls demonstrates functions of evaporative condenser and water defrost evaporator coil at San Francisco. L to r, H. E. Boudreau, vice president; Mr. Halls; Lewis Brooks, secretary; Walter Sandholt, past president; and Don Bryant.

Members-at-Large

LEROY ETZEL

THE list of members-at-large continues to grow, for which we are justly proud. Let's continue to invite qualified engineers in locations where we do not have a chapter to join our ranks. Take advantage of the services offered by Professor Venemann in the Question Box. Let's not allow the chapters to monopolize this feature.

Don't forget the National Convention will be held November 2 through 4, 1954, with the New Orleans Chapter as host. Those who have taken advantage of their hospitality at previous conventions can verify that an excellent social and educational treat is in store for you.

Here are some more active and associate brothers to get acquainted with through this column: In Maryland, a newer member, J. Henry Gross, building superintendent, Belvedere Hotel, Baltimore, and a member of much longer standing, Thomas S. Patterson, president, Tri-State Engr. & Sales, Inc., at Salisbury; in the nation's Capital: Vincent S. Peck, Sr. Oper. Engr., U.S. Gov't Printing Office; and J. W. Stockham, formerly with MSA and now operating his own business. Walter E. Bernd, V.P. Terminal Refrig. & Warehousing Co., needs no introduction to these columns or the NAPRE membership. However, we couldn't visit D.C. (in print) without mentioning this national past president.

Near the District of Columbia are two members, Charles W. Coblentz, chief engineer and Gustav L. Beinert, his assistant, at the Mutual Ice Co., Alexandria, Va. At Richmond, NAPRE member Herman J. Duke conducts a business of his own; and A. C. Kniseley, district engineer, Niagara Blower Co., makes his home there. Down in Georgia, C. J. Romberg is president, City Ice Co., Gainesville, and Robert B. Rich is manager, U. S. Security Warehouse, Columbus.

Robert S. Wood is in Division Maintenance for City Products Corp. at Miami, Florida, and Walter M. Galloway is general manager for Shippers Precooling Service, Lakeland. Operator and owner of Livingston (Tenn.) Ice Co., is Samuel Baxter Smith. A member with over 30 continuous years in NAPRE is John A. Coleman, engineer for Danville (Ky.) Ice & Coal Co. Back in Ohio, another new member in our ranks is Lewis A. Steele, chief engineer, Sheraton-Gibson Hotel, Cincinnati; he would like to see a convention in his city soon.

Out in Puerto Rico, member J. Gonzalez Prieto is manager & partner in the firm of Sucn. A. Lledo. Rolando A. Diaz is vice president and electrical eng'r for W. M. Anderson Trading Co., at Havana, Cuba. Down Mexico way, Jorge Rascon is engineer with Industrial De Abastos, S. A. de C. V., and H. Agustin Reed, is director general of Fabrica de Hielo Gomez Palacio, S.A.

Our English refrigerating engineer colleagues are no strangers to NAPRE. Maurice E. Anderson is technical assistant at J & E. Hall Ltd., and Alistair G. Addyman, an area engineer for Lightfoot Refrigeration Co., both in London. Up in Scotland, Robert Finlay is engineer with Wm. Milne, Ltd., at Glasgow. He informs us of an impending visit to the U.S. We hope to have this brother engineer visit with many of us, as did Joe Budge, Sydney, Australia, and Wm. Syme of Auckland, New Zealand, recently.

Los Angeles

FRED HERR

THE trend toward unit air conditioning of multi-chambered structures and the prominent part this form of room cooling has attained, was detailed in an illustrated talk presented at the March 17 meeting of Los Angeles Chapter, NAPRE, by Herman Singer, sales engineer for Drayer-Hanson, Inc., Los Angeles.

The title of Mr. Singer's talk was "Remote Air-Conditioning as Applied to Buildings." Speaking informally, and frequently referring to engineering drawings of typical hotel air conditioning unit installations, Mr. Singer devoted an hour to describing what is happening in the air conditioning phase of the refrigeration industry, what trends have and are taking place, and what types of new appliances and devices have recently come into prominence.

The speaker declared that forced air over fin coils was the first refrigeration principle used in air conditioning installations. This lent itself practically to large plenums serving central air distribution arrangements. He pointed out, however, that in his experience a centrally located air conditioning plant which distributes cool air through ducts into the various sections of a building, proved to be unsatisfactory for effective use in large hotels and office buildings.

"The engineer who has to design an air conditioning system for a hotel or office building is confronted with a problem differing materially from the man who is making plans for a conventional system for a building with one large room area," he said. "When a theatre, for instance, has to be air cooled, the engineer is faced with one large room or auditorium in which the heat load is nearly the same throughout. But in a large hotel he has to contend with different heat loads in different sections of the building at different times of the day or night."

W. R. Burnett of Los Angeles Membership Committee explains how "New Orleans must be stopped." Left to right, are Burnett, President Frank Eccleston, Treasurer E. T. Quinn and Secretary Donald H. Byl.

Because of the special requirements of office buildings, hotels and similarly divided structures, Mr. Singer said, several new developments in industrial air conditioning have come about. One of these developments, he explained, is the multi-zone system. While his system still enjoys wide use for hotel air conditioning, he pointed out that because of its duct method of air distribution, it is more practical in new construction where advance provision for installing ducts can be made. To install a multi-zone system in an existing building would require a considerable outlay for cutting through walls and ceilings.

The multi-zone unit, Mr. Singer declared, is however flexible enough in design to permit installation vertically or horizontally according to space requirements in different areas of a building. He submitted for examination drawings showing multi-zone units stacked one above the other in high-ceiling places and of others ranged horizontally along the floor.

Mr. Singer stated that the most important development in the field of air conditioning for hotels, schools, motor courts, and other structures that have many chambers is the individual room unit air conditioning system. This type, he said, is less expensive to install in either old or new buildings because only piping, no duct work, is required. Individual room units also are cheaper to install as well as to operate, he pointed out, because the individual unit in a certain room can be turned off when the room is unoccupied.

The preliminary class was conducted from 7 to 8 p.m., with Elmer Johnson of the California Consumers Corporation as instructor. His subject for the evening was Heat Calculations as presented in Chapter 18, Section 9 of Guy King's "Basic Refrigeration."

The business session was presided over by President Frank Eccleston. Three new members were inducted: George Hilt, James Tracy and William Campbell. William R. Burnett, pinch-hitting for the absent membership chairman Frank G. Muzzy, made a plea for Los Angeles Chapter to overhaul New Orleans, which, he reported, had wrested from Los Angeles the honor of being the largest NAPRE chapter in the world.

Ed L. Nelson of the Union Ice Company, entertainment committee chairman, gave a run-down of events scheduled for the balance of the year. Old Timers' Night, he reported, will be held on the last meeting night in June, complete with dinner and entertainment. He also announced that the traditional Ham-and-Beans dinner and novelty program will be arranged to kick off the fall activities in September.

Frank Eccleston, golf committee chairman, announced that a warm-up golf session will be held at the Montebello Golf Club on Sunday, May 9 to afford the players an opportunity to tune up their drives and sharpen their putts in advance of the fourth annual NAPRE tournament to be held at Montebello in June.

The meeting scheduled for the Terminal Club, Los Angeles, for Wednesday, April 7, was cancelled by vote of the membership in view of the chapter's field trip to the Shell Oil Company's ammonia plant in Ventura, Calif., on Saturday, April 10. Between fifty and sixty members and prospective members signed up for the Ventura trip.

Air Desuperheater

QUESTION NO. 996: In my dairy plant, I have a maximum 150-ton refrigeration demand and sufficient compressing and evaporating equipment but only sufficient surface for 105 tons condensing, even with exceptionally cold water being returned from my cooling tower. I have been told that I can pick up the additional condenser surface by installing an air cooled desuperheater, ahead of my condenser. I am enclosing literature provided me. I would like to know if this is considered to be a good practical installation. The desuperheater installation is estimated at $2,000.00, whereas additional condenser surface is estimated at $6,000.00 to $7,000.00.—B.L.S.

ANSWER: I think that you are mistaken about the possibilities of increasing your condensing capacity from 105 tons to 150 tons by the use of a desuperheater. The amount of heat removed in a superheater ranges from 8.4 to about 22.1 percent of the heat that must be removed from the discharge gas in order to liquefy it.

Some months ago I made a study of the advantages and disadvantages of de-superheating discharge gas with air, and summarized my conclusions in an article to appear in INDUSTRIAL REFRIGERATION in June 1954.

I am not familiar with current prices, but I believe that an additional 45 ton condenser should not cost more than one-quarter of your estimate.—H.G.V.

Moisture Removal

QUESTION NO. 997: Would you advise a certain or sure way of dehydrating a refrigeration system employing low pressure fluorinated hydrocarbon gas as a refrigerant?—E.R.C.

ANSWER: To make absolutely sure that a system has been properly dehydrated may be done by evacuating the entire system with a good quality vacuum pump which can obtain a vacuum of at least 29.75 inches of mercury.

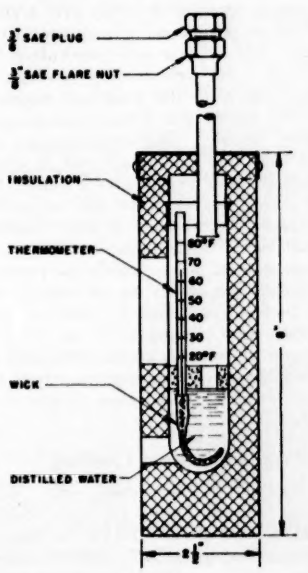
The type of instrument used for measuring a vacuum is of considerable importance. The ordinary Bourdon tube gauge (vacuum) is not sufficiently accurate at the high vacuums for this purpose. Bear in mind that the purpose of evacuating the system is to reduce the pressure low enough so that any small quantities of moisture will boil off at the existing ambient temperature. Reference to steam tables, or to the table below, will give the boiling temperatures of water at various low pressures.

TABLE 1 — BOILING TEMPERATURES OF WATER AT VARIOUS PRESSURES

Boiling Temperature Degrees F.	Absolute Pressure inches of Mercury	Vacuum in inches of Mercury 30-in Barometer
70	0.739	29.261
60	0.522	29.478
55	0.436	29.564
50	0.363	29.637
45	0.300	29.700
40	0.248	29.752
35	0.204	29.796
32	0.181	29.819

Note from Table that merely pulling a vacuum of slightly over 29.261 inches provides a boiling temperature of 70 F. If for example, the ambient temperature was 65 F the water in the system would not boil. However, if a vacuum of 29.752 inches were obtained (0.248 in. absolute) the boiling temperature of the water in the system would then be 40 F, and with an ambient temperature of 65 F, a temperature difference of 25 F would be available for the evaporation of the water.

One vacuum indicator that is used to good advantage in the refrigeration industry is shown below. It consists of an insulated glass enclosure containing a thermometer and a quantity of distilled water. A pressure tight fitting is sealed into the top of the glass enclosure for attachment to the system being evacuated.



This type of indicator makes it unnecessary to consider the vacuum reading in inches of mercury, since the boiling point of water in the system can be read directly on the thermometer. Since this type of gauge is very sensitive to contamination, it is important that only distilled water be used, and the gauge be protected against the possibility of drawing oil or other contaminants from the system or from the vacuum pump during its use.

The use of a refrigeration compressor is entirely unsatisfactory for the purpose of dehydrating a system by the high vacuum method.

In new installations where liquid water may be present in the system, it may be necessary to keep the vacuum pump in operation for a period of 24 to 30 hours. The progress of the dehydration procedure can be checked periodically by stopping the vacuum pump, valving off the suction line and observing the rise in pressure within the evacuated system. If the pressure in the evacuated system rises appreciably within one half-hour, the presence of liquid water in the system is indicated. If however, the pressure in the evacuated system does not rise more than 1/10 of an inch of mercury during an overnight shutdown, the system can be declared reasonably free of moisture. — Clayton B. Cramer, Carrier Corp.

EDITOR'S NOTE: Mr. Cramer's answer, an excerpt from his 1952 paper, "Why Compressors Grow Old", refers to the dehydration system improved by Paul E. James, USDA, Beltsville, Md. Mr. James describes his modifications and applications which may be of interest to E.R.C. in the June '53 issue, Refrigerating Engineering.—H.G.V.

Non-Freeze Solution

QUESTION NO. 998: In one of our plants, we have a modern evaporator coil which is continually defrosting by circulating a non-freeze solution over the coils. I have been asked time and time again by my employer if there is any way of preparing a more economical solution than the one we are now using. I have been unable to answer his questions. Have any of the Question Box readers had any experience in this connection?—G.K.

ANSWER: The solution which our firm uses is basically Ethylene Glycol which we buy in 500 lb. drums at a fairly economical figure. Into this solution, we put four ounces by weight of an inhibitor called Triamine per each gallon of Glycol solution. This inhibitor, we understand, is a special compound consisting of two inhibitors; one to protect non-ferrous metals, the other to protect ferrous metals. Proper concentration of the solution as used in the system, can be checked by simple and standard phosphate tests.—R.G.

Salt-Ice Production

QUESTION NO. 999: Are there any machines designed and marketed in the United States for manufacturing ice from sea water? I am familiar with equipment produced by many large U. S. manufacturers and with the product produced by one firm using a eutectic solution to produce a salt ice. My application is to sea water, and cannot use the latter equipment.—E.H.

ANSWER: The Readers' Service Department of INDUSTRIAL REFRIGERATION ran down this answer. Two manufacturers are in production of such machines. One, the Belt-Ice Corp., Seattle, writes "The several machines we have on shipboard

NAPRE

Question Box

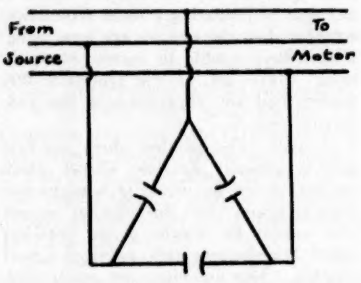
The National Educational Committee, NAPRE, answers monthly in this column, operating problems forwarded by members. The Committee appreciates answers from the field. Both questions and answers should be addressed to Prof. H. G. Venemann, 259 Littleton St., West Lafayette, Ind.

get excellent results from the use of such ice; it is somewhat colder; it has some bactericidal properties; as the fish live in salt water, they cannot be injured in any way by the salt ice. The ice peels off very readily from our machines, leaving the drum at 15 or 18 F, depending on the suction temperature."

The other, Burge Ice Machine Co., Chicago, informed the department that they have manufactured salt water ice and that they can see no handicap in using their equipment in this connection. It will reduce the rated output of the machine which, of course, is based on the use of fresh water. For further information, I suggest you contact these firms, or write INDUSTRIAL REFRIGERATION.—H.G.V.

Capacitor Usage

QUESTION NO. 1000: Saw an article where an engineer installed a capacitor bank to reduce percentage of voltage drop in starting, thereby saving cost of rewiring and lost time for his employer. It was in connection with a fan for an air conditioning system. Seems they replaced 2-200 hp electric motor fans with a single 400 hp, 220 volt synchronous motor driven fan. Couldn't bring motor into step because of a 22 percent voltage drop on starting. A 135 kva-r, 3 phase, 230 volt capacitor bank was installed. (a) Could you sketch a simple wiring hookup of such a capacitor bank? (b) Explain how it works? (c) What is a *practical* definition of that term *kva-r?*—H.A.T.



ANSWER: (a) Above figure shows simplified wiring diagram or hook-up of three identical 45 kvar capacitors.—G.V.M., Purdue.

(b) A capacitor is an electrical condenser device which in this case is applied to the motor or power lines to give the motor a higher Power Factor on starting than it would normally have. The higher the PF, the lower the amount of starting current required. The lower the starting current, the less the voltage drop. When the subject motor is up to speed and synchronized, the capacitor bank should be disconnected.

The same function of the capacitors could be accomplished in a plant having more synchronous motors, if these motors are running or on the line when the 400 hp motor is started.—J.R.W., Chicago.

(c) *Kvar* is a symbal for kilo-volts times amperes, and *r* signifies reactive *kva.*—G.V.M., Purdue.

New Questions

Eutectic Solutions

QUESTION NO. 1001: We are distributing ice cream on a cream pick up route and carry the ice cream in an insulated box. We have been cooling the box with a preparation called "Sno-Gel". It is a sort of jelly like substance put up in plastic containers but these containers do not stand up. What is this "Sno-Gel" made of or is it some sort of secret or patented preparation?

We are considering putting a weak solution of calcium brine in small cans, a pint or so, and freezing them in the hardening room and using them to refrigerate the box on the truck. The ice cream is cooled to minus 15 or 20 F before being loaded. Do all these solutions such as are used in cold plates expand when frozen, and how are they treated to overcome the corrosion factor? We intend to use dry ice this summer, altho it is not too convenient to get and store.—J.N., Nebraska.

Room Sweating and Product Dehydration

QUESTION NO. 1002: In order to accommodate certain home grown fruits from my farm, and other items such as citrus fruit from Florida, I built under the porch of my home with entrance from my basement, a cool room, using an approved seal-type compressor located in basement and a circulating fan within the cool room itself, the refrigerant used being F-12.

I maintain therein a temperature of between 38 to 42 F which over a couple of years seemed to give satisfactory results, but of late and particularly this season I am experiencing spoilage and dehydration in the fruit and vegetables to the extent that I feel there is something wrong. The condensation from the coil and circulation fan is carried through pipe to the gravel below floor of room, but at times and particularly of late it seems there is more condensation than is carried away and drip occurs from various points within the room.

Could you advise me on what to seek as perfect conditions for such an operation; what temperatures are best for certain of contents above mentioned and what corrective measures you would suggest to accomplish most favorable results.—P.S.C., Indiana.

Direct Radiation Cooling

QUESTION NO. 1003: Re "Warehouse in 100 Days" February INDUSTRIAL REFRIGERATION on page 29 under "Refrigeration" subhead, author refers to ". . . effective cooling by direct radiation". Was that the correct word, radiation, or did he mean direct expansion? Or did he mean more effective cooling through the theory of natural convective currents over and around storage, the heavier cold air displacing the warmer air below? It will certainly be appreciated if you would let me know if radiation was the word or if it should have been direct expansion. Any other comments about that particular subhead might be helpful.—R.K.

Crankcase Pressure Device

QUESTION NO. 1004: I'm refrigeration supervisor at a U. S. Air Force Base. On several new installations I notice they have installed a crankcase regulator—a sort of an evaporator regulator in reverse, to keep a certain pressure in the crankcase so as not to overload the motor, I think. Is this really any value, and wouldn't a pressure limiting expansion valve serve the same purpose?—C.B., Alaska.

Stainless Belt Corrosion

QUESTION NO. 1005: We have a problem with two flake ice makers. The stainless steel belts are practically eaten up with holes from inside after six months use and sometimes less, due to corrosion. Calcium Brine is made up from city water taken from the Mississippi River; less than six grain hardness. The manufacturer has been unable to solve the trouble; the, contractor who installed the machines in 1950 is unable to find the answer.—J.C., Ill.

Mountain States Conference

A SPRING conference will be held by the Mountain State Association of Ice Industries at the Brown Palace Hotel, Denver, Colo. May 14 and 15, 1954, according to an announcement by J. Reimer Espy, secretary. Officers and directors of the association were reported working diligently for a program full of common sense ideas, together with a little fun on the side. This, it is stated, will be the only opportunity for ice men of the region to get ready for the summer season.

Louisiana Ice Plant Sold

THE City Ice Service, New Iberia, Louisiana, has been purchased by Joseph A. Doigre, local business man and former Mayor of New Iberia. City Ice Service which has changed ownership several times during its more than 50 years of existence was originally started at the turn of the century by the late Victor Erath as an ice and coal plant and bottling works.

New NAII Members

THE National Association of Ice Industries announces the following new members: Howard Ice Co., Howard, Kan.; Home Ice and Coal Co., Huntsville, Ala.; Pleasanton Ice and Cold Storage Co., Pleasanton, Kan.; Bloomington Ice Co., Bloomington, Ind.; Walter Ice and Fuel Co., Anahuac, Texas, and Wellington Ice and Cold Storage Co., Wellington, Kan.

Relative Humidity in Storage of Cheese

A RELATIVE humidity of 80 percent is dangerously high for long-time storage of cheese even at temperatures of 30 to 34 F according to Dr. Walter V. Price, University of Wisconsin and member of the TRRF Advisory Council. He emphasizes that the humidity inside the boxes of cheese stored under such conditions will be higher than the relative humidity of the air in the room surrounding the boxes. The growth of mold tends to increase rapidly as the relative humidity increases above 70 percent.

The moisture from the cheese itself contributes to the relative humidity of the air surrounding it in its container. Lowering the relative humidity of the air surrounding the pile of the boxes of cheese becomes more effective, therefore, if there is a circulation of air in the storage room. It is impossible to state the rate of air movement, but the conditions to be most effective should result in a relative humidity within the boxes of approximately 70 to 75 percent. The longer the holding period, the more advisable it would be to make the lower limit the maximum.

Another danger to the cheese in storage is mite infestation. The work which Bob Dicke and Keith Ihde did indicated that cheese mites are very sensitive to low humidity. At a relative humidity of 55 percent or less, mite activity is negligible. The optimum relative humidity for their growth approximates 90 to 100 percent.

When we remember that the relative humidity in the boxes in a poorly-ventilated room, or a room in which there is little or no movement of air to encourage drying, then this condition of 90 to 100 percent relative humidity in the air immediately surrounding the cheese is easily attained. For this reason also, it is recommended that relative humidities in the storage room itself approximate 70 to 75 percent with air movement to induce the small level of relative humidity in the containers in which the cheese is stored.

These comments apply especially to paraffined cheese stored in wooden boxes. The relative humidity of the air in the room in which wrapped cheese is stored should preferably be lower than 70 percent. This low humidity will tend to prevent mite infestation, will not damage the cheese due to dehydration, and will tend to prevent mold growth where organic material from handling the cheese or wrappers may provide conditions suitable for mold growth.

New York State Expands Food Processing Research

AN APPROPRIATION of $1,800,000 in the 1954-55 state budget is expected to expand considerably food processing research at the New York State Agricultural Experiment Station, Geneva, N. Y. The appropriation is to be used to construct a three-story building with more than an acre and a half of floor space to house the station's food science and chemical laboratories. Scientists will test new methods of preserving the state's vegetable and fruit crops by canning, freezing and dehydrating.

A special feature of the building will be a two-story pilot plant, 60 by 120 feet, where complete canning, quick freezing or any other type of food processing may be tried in a full-scale operation. Rooms will be available in the new building in which temperature and humidity can be controlled so as to provide conditions comparable to those in arctic regions or in the tropics. These rooms will be used to study the effect of extremes of temperature on the storage and packaging of processed foods.

Don't Carry This Hitchhiker In Your Refrigerating System

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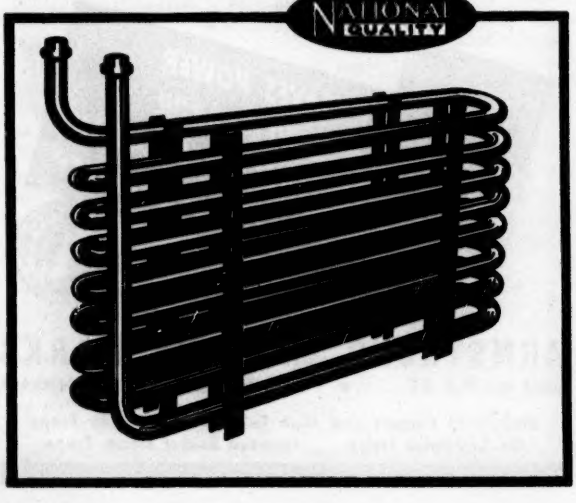


An air-conditioned, small-animal room will permit nutritional studies. A small greenhouse on the roof of the pilot plant will provide facilities for special plant research requiring carefully controlled conditions. A cooling and ventilating system will make it possible to maintain uniform conditions in the greenhouse all year.

Construction of the food science building is expected to start this summer. It is the second of three large construction projects planned to expand and improve the experiment station's facilities.

Deep Freeze Test Tells Age of Archeological Relics

DETAILS of a new technique that may extend the "atomic calendar" back 44,000 years and make it even more accurate have been disclosed by University of Chicago chemists. A scintillation counter is used, housed in a deep freeze unit. The faint flickers of light given off by radiation are detected by photomultiplier tubes so sensitive that they would emit electrons at room temperatures. That is why the counter is housed in a deep freeze.

The technique was developed by James R. Arnold, assistant professor of chemistry in the university's Institute for Nuclear Studies. Prof. Arnold outlined the development for the Scintillation Counter Symposium in Washington, D. C.

The radioactive method of dating objects by the amount of radioactive Carbon 14 they contain has been found reliable for a span of about 25,000 years. The method was developed in 1949 by Prof. Willard F. Libby, of the university's chemistry department.

Prof. Arnold, who was associated with Prof. Libby in the earlier development, has refined the technique by using a scintillation counter, 10,000 times more sensitive than a conventional Geiger counter.

Similar research with scintillation counters was announced recently by four University of Manitoba scientists. The scintillation counter itself was developed in 1949 by Dr. R. W. Pringle, head of Manitoba's phvsics department, and an associate, Prof. K. I. Roulston. Prof. Arnold's counter, like the Manitoba counter, detects radioactive Carbon 14 by the light its radiation produces in a fluorescent solution. The sample material to be tested for age is dissolved in the fluorescent liquid.

Prof. Libby's original results in applying the atomic calendar technique were subject to a possible error of 120 years. Prof. Arnold said he has reduced this error to 37 years. and that potentially he can cut it to 17. This, he said, would make possible the dating of archeological relics with greater accuracy.

Maintenance Show to Answer Mechanical Problems

SOLUTIONS to a wide variety of industrial maintenance problems will be found among the latest methods and equipment application developments to be exhibited at the Western Plant Maintenance Show in the Los Angeles Pan Pacific Auditorium, July 13-14-15. The show is designed to aid engineers and plant management in such diversified problems as mechanical failures, maintaining floors and working areas, filtering hot or cold corrosive liquids, caster lubrication.

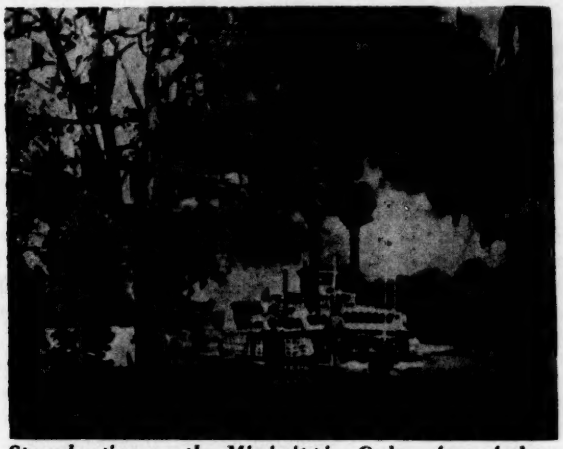
Demonstrations of cost cutting maintenance methods will be supplemented by exhibits of plant equipment. Concurrent with the Los Angeles industrial show will be a maintenance conference featuring top experts in the plant maintenance field emphasizing solutions to specific problems peculiar to industries of the west.

NAPRE Convention Plans Move Ahead

MORE appointments to the 45th Annual NAPRE Convention Committee were announced in April by President Leo J. Vivien. Convention Chairman Addison E. Wegener announced the slogan for this year's meeting is "Make it Your Vocation-Vacation Convention."

Appointees to assist Wegener are John J. Bryner, national past president, Frank Chase, a national director, Francis McCarthy, Julius Prager and Thomas O'Connor, vice-chairmen; Frank Gillio, committee secretary; and the following as sub-committee chairmen: Jerry Vieages, entertainment, Dan Behre, publicity, Marion Olivier, educational, Jimmy Chasson, reception, John Mariakis, program, and Geo. Whitman, finance.

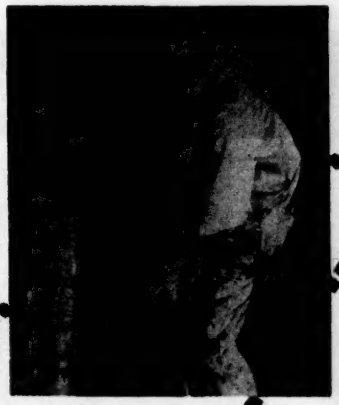
In setting up the slogan for the convention, Wegener explained that more and more members are utilizing combination vacation and business time to travel these United States to the annual convention site. He stated that the educational pro-



Steamboating on the Mississippi. Only a few of these steamboats remain on the river. New Orleans is terminus for the world's greatest inland waterway system.

Greenwood, Louisiana Plantation Home. Scattered throughout Louisiana are many old plantation homes, which serve as reminders of legendary past of the South.

BEST—from every angle—



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gram and exhibits—the vocational part of the slogan—would be outstanding, and for the vacation angle no other city in the United States is like New Orleans. It is a city of striking contrasts, of unique attractions and of rare charm.

Addison E. Wegener

According to the chairman, New Orleans is perhaps the only city in this country which gives the visitor the feeling that he is both in the United States and out of it. It is truly an American city, but more than any other American city, it offers a distinct foreign atmosphere. The charm of New Orleans is varied, said Mr. Wegener, and there is no single thing which is wholly characteristic of her, just as there is no other city exactly like her. Visitors discover this only when they combine her fine old traditions with her vigorous modern ideas.

Chairman Wegener continued his vacation theme by explaining that with a climate that permits outdoor activity twelve months of the year, the opportunities for recreation in New Orleans are unbounded. Lake Pontchartrain offers bathing and boating. Fresh and salt water fishing is possible through all months of the year within and near the city, and migratory waterfowl use the Louisiana coastal areas as their winter haven. The Sugar Bowl Classic which climaxes the Mid-Winter Carnival of Sports, is an annual peak tourist attraction. The night life of the city is varied, unique.

There is no need for a dull moment in New Orleans. Within the 365 square miles that is New Orleans, from the beautiful lakefront to the mighty curving river are innumerable points of interest, modern and ancient, that explain emphatically why the city is so widely known as the South's greatest city and America's Most Interesting City. "Come to Old New Orleans for your Vocation-Vacation Convention."

ASHVE Summer Meeting

COME summer, sedate Swampscott, Mass., 11 miles north of Boston, will hear about AUST-values; non-uniform environment; south-facing, vertical, flat-plate collectors; solar constant, and trillion horsepower hours. These are terms 600 members of The American Society of Heating and Ventilating Engineers will use during their 60th semi-annual meeting, at the New Ocean House, Swampscott, June 28-30, 1954.

Prof. B. H. Spurlock, Jr., the Program and Papers Committee Chairman, announces that an excellent group of technical papers will feature the sessions. Among topics for discussion are solar radiation, air filtration, operating costs of residential cooling, relation of room size and panel area, and vertical jets for hot and cold air.

R. T. Kern, Fitchburg, Mass., general chairman, and A. L. Hare, Boston, Mass., vice-chairman of the Committee on Arrangements, with Honoary Chairman, Dean Lauren E. Seeley, Durham, N. H., a Society past president, plan educational and entertaining activities.

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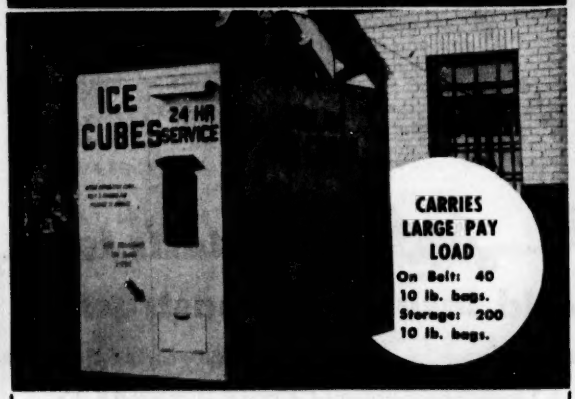

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Mayo Hotel, Tulsa Adds Air Conditioning

HOTEL Mayo, Tulsa, is adding additional tonnage to air condition six more floors, making the entire 17 floors of the establishment comfort cooled. The present addition consists of two more 8-cylinder York VW compressors, together with condensers and chillers to develop an additional 300 tons. This new plant will chill water to be circulated to a furniture building adjacent to the hotel. and the present system handling that building will be cut into the hotel system. The existing plant consisted of 700 tons, with 300 being applied to the furniture store by two York VW 8-cylinder compressors. The other 400 tons of hotel air conditioning was developed by four York 6-cylinder compressors driven by only two motors.

The comfort cooling system in the hotel has a unique feature in that circulating pumps handle water from high pressure heat exchangers through the ventilating system coils for winter heating. These same pumps circulate chilled water from the refrigeration system through the same coils for summer cooling. The hotel system does not employ separate cooling, heat or reheat coils. Humidity in the summer months at Tulsa seldom exceeds 60 percent.

The present alterations to the hotel include replacement of an 80-can ice plant and two 9 x 9 ammonia compressors, with one Vogt tube-ice maker of approximately five tons serviced by a 25 hp York 6-cylinder VW compressor. Ice from the Vogt equipment moves by screw conveyor from the bottom hopper to two ice storage bins—one for broken, the other for full size ice cylinders. A slotted bottom in the conveyor where it passes through the broken storage bin allows any size ice less than standard 2-inch cylinder to drop out. Whole size segments pass to the end of the conveyor line and the other storage.

Circulating ice water at the Mayo is chilled by a carrier 6 cylinder VW machine. A 50 ton redwood and transite cooling tower on the 4th floor service roof acts as a heat exchanger for condensing water and jacket cooling in connection with compressors for the ice maker, ice water chiller, walk-in ice boxes and miscellaneous refrigeration systems. A new 1,000 ton all redwood Marley cooling tower has just been completed on the same roof area replacing a 700 ton steel tower previously used.

The Mayo boiler plant provides steam heat not only for their own building, but for the furniture building adjacent and for a Sears, Roebuck department store across the street.

Committee Recommends Shipping Studies

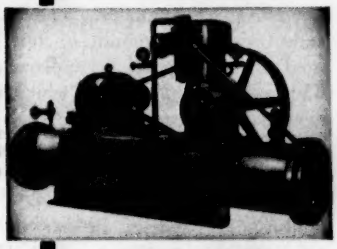
THE Transportation Research Advisory Committee has recommended expansion of studies on the refrigeration of fruits and vegetables in refrigerator cars and trucks. The committee has also recommended expansion of work on control of decay in fruits and vegetables during shipment, storage, and retail display. Recommendations of the committee, established under the Research and Marketing Act of 1946, were made after its annual meeting, March 17-19.

Other top recommendations of the committee, directed toward maintenance of product quality during transportation, were the expansion of studies of improved and cheaper shipping containers, and of time-temperature tolerance work on frozen fruits, vegetables, and poultry.

The Case of the Unwanted Thumbprint

BY HOWE . . . THE WORLD'S CHILLER

John Q. Packer studied his financial statement with dismay. "Could it mean that old "Dirty Thumb" Obsolescence is here in *my* plant? Yes, there are his prints all over my profit sheet!"
Startled, "J.Q." called in the Howe "private eye". Quickly they found the culprit hiding in the obsolete, inefficient refrigeration system. The unseen losses had been robbing "J.Q." *cold.*
John Q. is purring like a kitten now! His new Howe equipment provides *exact* temperature and humidity at *all* times! It has cut risk of spoilage, assures better production, and keeps his products at profit peak. "The know-how of 42 years' specialization goes into those machines", said the private eye, hurrying to his next case.



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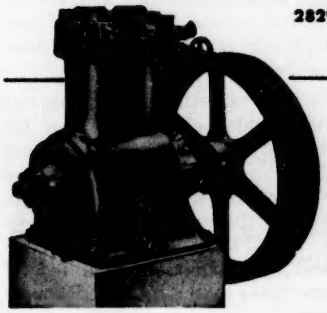

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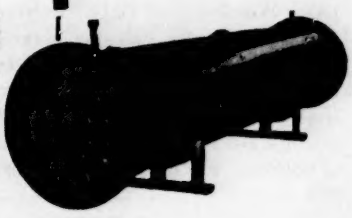


NARW President Tells How Warehouse Industry Meets Frozen Food Needs

TO MEET an anticipated increase in demand for freezer storage space as a result of the frozen food industry's estimate of a record production of 4.5 billion pounds of frozen foods in 1954, the Refrigerated Warehouse Industry will have added over seven million cubic feet of freezer storage space by the end of this year, according to R. M. Conner, president of the National Association of Refrigerated Warehouses.

Mr. Conner, who is vice president and manager of the United States Cold Storage Corp., Chicago, Ill., said in a speech at the National Wholesale Frozen Food Distributors' Association annual convention that refrigerated warehousemen are putting the emphasis on "sharp freezer space, or at least space that can be converted to operation as sharp freezer upon demand." This means that more and more storage space will be available for frozen food storage.

Storage Facilities Expanded

"Since the end of World War II," he told the frozen food distributors, "our industry has been expanding and increasing its facilities to better serve your needs. In this period the industry has avaraged somewhere near 10 million cubic feet of expanded space annually. Today, the industry's total amount of refrigerated storage space is approaching 450 million cubic feet, of which well over half is freezer storage space."

Continuing, he said that "during the past fourteen years, the growth of freezer space has more than doubled in capacity in our public refrigerated warehouses. In 1939 there was 108 million cubic feet of freezer storage space in operation as compared to over 235 million cubic feet in operation now."

Mr. Conner pointed out that additional encouragement for the extreme essentiality of Public Refrigerated Warehouses can be obtained from the fact that the Office of Defense Mobilization last week put refrigerated warehouses back on the essential list for receipt of certificates of necessity and stepped-up amortization.

Materials Handling Improved

Getting into the operation end of refrigerated warehousing, the NARW President told the frozen food distributors that "our industry has found that it has to operate differently than it did 'in the old days.' We have adopted better materials handling techniques to take care of your products, utilizing modern and practical materials handling methods in both the handling and storing of frozen foods and the many other perishables for which refrigerated warehousemen are custodians.

"We have had to cut our costs and increase our operational efficiency because of the tremendous increases in labor costs which we have experienced during and since world War II. The constantly increasing amounts of taxes and the general increases in all overhead expenses have combined to offset much of the pleasure we have received in increased revenue, as a result of your increased volume, for the storage of more and more pounds of products.

"But," he assured, "by the utilization of sound business common sense and a constant attention to the many and varied cost factors in our industry, we are hopeful, and optimistic, that we shall continue to be able to give you the kind of service you want, when you want it, and at consistently fair and equitable prices for that service. We know that yours is a selling industry, and ours is a service industry. Our service has to please you and help you do a constantly better job of selling. Otherwise we're not fulfilling the responsibilities that are ours and with which you challenge us every day."

He said that the refrigerated warehouse industry has become quality-conscious on a very large scale, utilizing the latest scientific instruments and methods to maintain positive temperatures and humidities control that insure maximum protection for the commodities in storage.

Research Projects

In pointing out that this year marks the tenth anniversary of The Refrigeration Research Foundation, which was organized in 1943 by members of NARW, Mr. Conner said that the Foundation is now sponsoring many research projects in various universities and colleges over the country that will enable refrigerated warehousemen to do a better job of storing and handling the many commodities which have been entrusted to their care.

"Many warehousemen," he said, "are equipping their plants with quick-freezing facilities and new breakup rooms as part of their overall effort to increase their services to their customers."

Also, he told the frozen food distributors that "the extremely close relationship between the frozen foods people like yourselves and the refrigerated warehousemen the country over, is becoming recognized almost as a 'family affair.' Like all families," he said, "we find we have mutual problems, with numerous developments, some troublesome, some pleasant, taking place every day and every week of the year. However, I know of no problems we cannot solve through 'family conferences' like this and turn them into additional success and progress for our mutual good, and in the public interest."

U. S. Cold Storage Net Rises

UNITED States Cold Storage Corp. reported 1953 earnings of $462, 008. or $4.27 as share. This compared with $331,510, or $3.06 a share, in 1952. E. M. Dodds, president, told shareholders the earnings were the best since 1948 and were due in part to larger storage stocks and to adjustments in rates following the removal of price controls.

Mr. Dodds said the company entered 1954 "with good occupancy in the warehouses and expectation that earnings will be satisfactory." But he warned also that "the business is so dependent on livestock, dairy and frozen food production and the influence of various governmental controls that it is difficult to make long range forecasts.

He also stated, that a common stock trust is being formed for the benefit of "certain key and other qualified salaried employees" and will be submitted for stockholder approval in the next annual meeting. The trust has already been approved for exemption from federal income taxes by the Internal Revenue Service.

Cooling Tower Institute Elects Officers

THE Cooling Tower Institute, nation-wide association of manufacturers of industrial water cooling equipment, has elected Neal B. Lau Bach of Hudson Engineering Corp.,

New officers of Cooling Tower Institute: Paul R. Hoffmann, Neal B. LauBach, Clayton E. Pickup, Robert R. Pabodie

Houston, Texas, president. Other new officers are: Paul R. Hoffmann of Lilie-Hoffmann Cooling Towers, Inc., of St. Louis, vice-president; Clayton E. Pickup, The Fluor Corporation, Ltd., Los Angeles, secretary; and Robert R. Pabodie of United Cooling Tower Co., Kansas City, Mo., treasurer. President for the 1953 term was Leon T. Mart of The Marley Company, Kansas City, Mo.

The Institute is now developing a field testing technique for industrial cooling towers with specially designed test instruments which have been assembled in the Houston area.

No Shortage of Storage Space For Foods

TO OFFSET reports of serious shortages of storage space for commodities purchased by the Commodity Credit Corporation, the National Association of Refrigerated Warehouses points out that these reports apply only to grain storage, and not to space used for the storage of perishable foods.

In a letter to J. A. McConnell, Administrator, Commodity Stabilization Service, the Association said that "public refrigerated warehouse space for perishables such as dairy products, frozen foods, meats, etc. is in good supply throughout the country and is constantly expanding.

"The public refrigerated warehousing industry has always been able to take care of CCC needs, in addition to other demands, and is continuing to store millions of pounds of CCC perishables without loss," the letter emphasized.

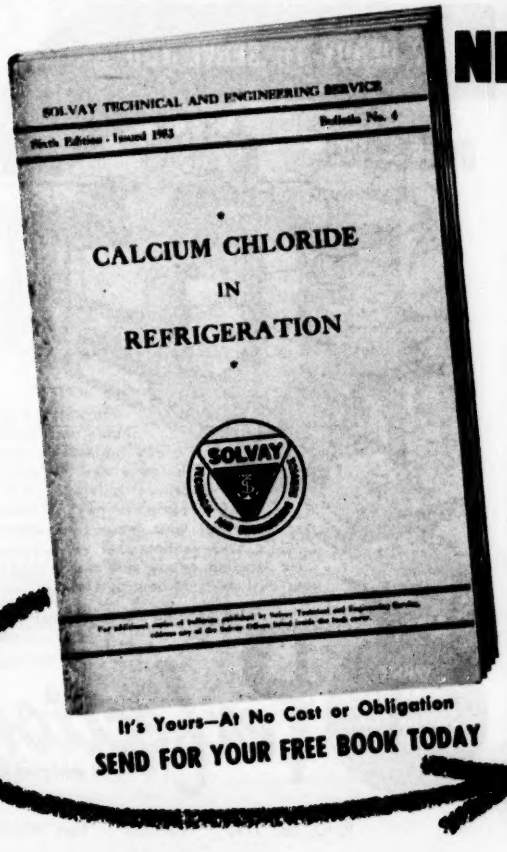
At present, the public refrigerated warehouse industry is operating almost 450 million cubic feet of refrigerated storage space, according to NARW. The Association speaks for over 90 percent of the space available in the Public Refrigerated Warehouse Industry.

Locker Plant Sold to RFC

THE Davis frozen food locker plant at Calhoun, Ky., has been sold to The Reconstruction Finance Corporation for $7,000. Following confirmation of the sale RFC will dispose of the property. The sale was conducted on a Federal Court order to satisfy a judgment for $35,000.

Kentucky Ice Plant Sold

THE Farmers Supply Company, Inc., of Danville and Perryville, Kentucky has announced purchase of the building and business of the Perryville Ice and Produce Company, Perryville, Kentucky. In addition to ice this company handles a line of merchandise including stock feed, paints, poultry supplies and equipment, field and garden seed, fertilizer, insecticides, general hardware, fencing, roofing, farm machinery, bottled gas and gas ranges.



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56-6

Ice Industry Holds Regional Meetings

FOLLOWING plans of the National Association of Ice Industries at the Mid-Winter meeting of the Executive Committee, a series of regional meetings have been announced.

The purpose of these conferences is to more effectively serve the Ice Industry. The meetings will enable the officers of the Association and the members of its staff to find out what the members want. It will permit all members to have a hand in the planning of the Association's program.

The meetings will provide a clearing-house for exchanging Ice information on a local basis. They will give members and non-members an opportunity to discuss local problems with other people who have experienced identical problems.

Finally, the staff, through its participation in these conferences, can build up a tremendous amount of valuable information for use of the membership.

Plans call for having a member of the Executive Committee or the Board of Directors serve as moderator at each conference. All meetings are to be round-table discussions with the agenda planned to meet the needs of the area. The meetings will be primarily management and merchandising clinics. The topics will be vital to management and to all personnel engaged in the merchandising and marketing of Ice from top management down. Two members of the NAII Washington staff will be present at each session.

To start the program, conferences were held in April as follows: St. Louis, Mo., Sheraton Hotel, April 20; Memphis, Tenn, Hotel Peabody, April 21; Biloxi, Miss., Buena Vista Hotel, April 23.

Two meetings for early May are announced as follows: Cincinnati, Ohio, Netherland Plaza Hotel, May 5; Chicago, Ill. Sherman Hotel, May 6.

Denver Building Air Conditioned

THE first completely air conditioned major office building in Denver, the ultra-modern Stearns-Roger Manufacturing Company Building at 660 Bannock Street, was expected to be ready for occupancy the latter part of March, it was announced by the owner, a distributor of air conditioning equipment for Carrier Corporation. The building is the first of several large structures soon to be completed in Denver which are air conditioned by Carrier. The largest of these are the 19-story Denver Club Building and the May Company department store.

The new five-story Stearns-Roger structure exemplifies the newest trend in design, an abundance of glass in an air conditioned building decorated in light harmonizing colors and featuring simplicity of design. Heat resistant glass windows which provide a maximum of natural light practically surround the building at each story. Horizontal and vertical shading devices prevent the direct rays of the sun from entering the building during regular working hours.

The building will be equipped with a Conduit Weathermaster system similar to the one in the United Nations Secretariat. The system provides year-round control of temperature and humidity together with ventilation and circulation of filter-cleaned air.

Architectural work was performed by Stearns-Roger. Engineering was also performed by this company and Carrier in conjunction with Roger Musick.

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RELIEF VALVES

For Ammonia and Freon. One Piece body design—rustproof finish. Internal construction—stainless steel—will not corrode. Positive relief action. Pressures from 75 to 400 lbs.

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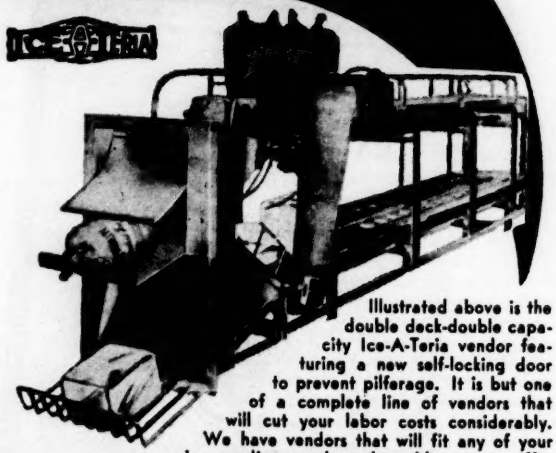

Illustrated above is the double deck-double capacity Ice-A-Teria vendor featuring a new self-locking door to prevent pilferage. It is but one of a complete line of vendors that will cut your labor costs considerably. We have vendors that will fit any of your ice vending needs and enable you to offer your customers 24-hour service.

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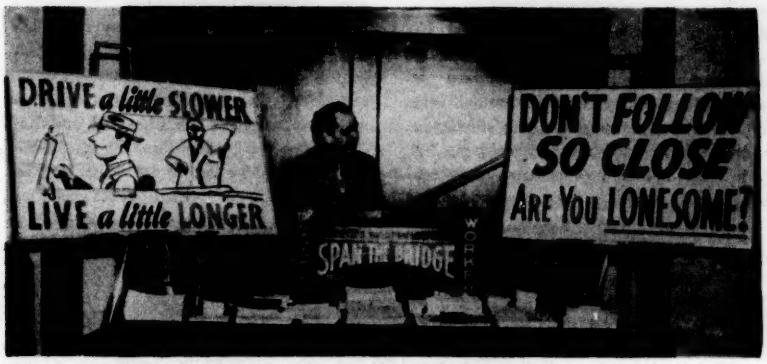


W. F. Leonard, Jr. drives home the high points of Demonstration-Address.

CARRYING the story of safety and how to cut down accidents, W. F. Leonard, Jr., chairman of the Ice, Cold Storage & Locker Plant Division of the National Safety Council has appeared at a number of ice conventions and other meetings. He uses a safety exhibit with charts and a running commentary telling how to institute and carry on effective safety work.

Among his more recent appearances were the Delta States Ice Convention; the Oklahoma-Kansas Ice Convention and the Junior Chamber of Commerce, Austin, Tex. Commenting on his presentation at the Delta States Convention Bob Milling, secretary says: "Mr. Leonard did a superb job and from the attention and interest displayed by delegates, one that will bear fruit." In the picture above he is shown with charts, visual aids, and other safety material at the Southwestern Ice Convention at Mineral Wells, Texas, February 17-19.

New Refrigerated Plant For Frozen Dough Products

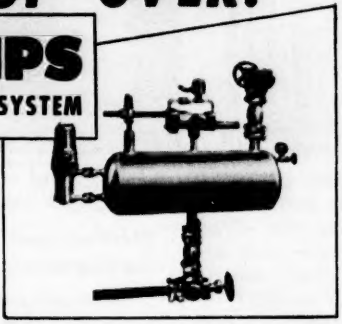
LIGHT Crust Flour Mills has scheduled for completion by early summer, the Southwest's first refrigerated plant for the manufacture of a new line of frozen dough products, President Jack P. Burrus said. The new products will feature frozen cakes, improved buttermilk biscuit, frozen preshaped cookies and pie dough. The plant will serve Texas, Oklahoma, Arkansas, Louisiana, and the southern states area. General offices for the Burrus Mills are located in Dallas. The plant will be located north of Fort Worth.

Department Store Installs Air Conditioning

AN AIR conditioning system will be installed in the new building of the Boston Store, a Wilkes-Barre, Pennsylvania department store, at an outlay of $42,800, according to a permit issued by the city building inspector. The contractor is the Power Engineering Company, Wilkes-Barre.

NO SLOP-OVER!

PHILLIPS
LIQUID RETURN SYSTEM



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For 25 Lb. Block
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Grinds 25 lb. block in 25 seconds with grate closed.

Four grate adjustments gives crushed ice from "pea-size" to 1½" chunks, by merely turning grate handle on side of hopper.

Galvanized for prevention of rust.

All-steel shell, legs and grate handle.

Belt driven, no gears, and self-aligning ball bearings.

Chute for filling containers.

Safety-shelf for block ice to be placed before entering crusher.

Guard covers flywheel, belt and motor pulley.

Only $125.00 with 1/3 HP motor.

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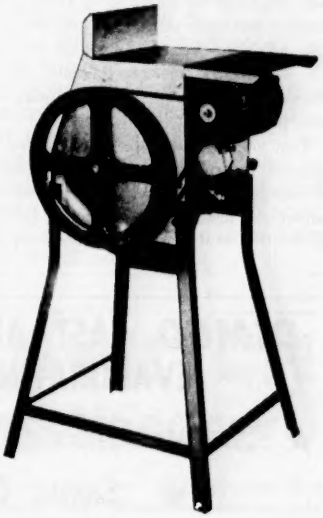

Write For Full Information

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Ice Processing Equipment
MINERAL WELLS, TEXAS

Mercury Manometers—Asset or Liability?

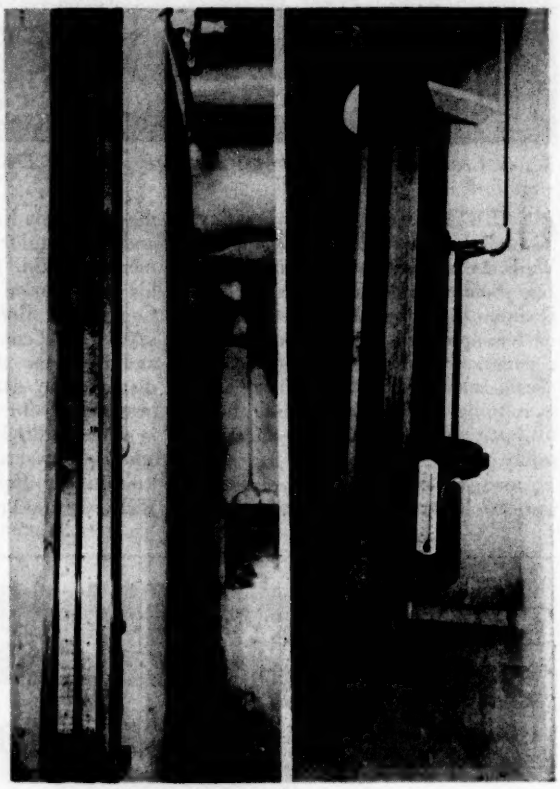
THE Question Box conducted by Professor H. G. Venemann in this publication is often obliged to its readers for assistance. One of the most recent and most important, forwarded to Prof. Venemann by a subscriber concerned the use of mercury manometers in ammonia service.

As published in September 1939, *Ice and Refrigeration*, we were asked, "Is there any question of safety in the use of a mercury manometer pressure gauge on the suction side of ammonia systems? Over a period of time, will mercury react with the ammonia to form an explosive mixture?"

Prof. Venemann discussed this problem with an eminent chemist who assured him that "there is no normal reaction between ammonia and mercury that would produce an explosive mixture." He suggested that if any reaction did occur due to the presence of oil or other impurities, the mercury would turn dark at the meniscus, thus warning that it was time to clean the manometer.

Again in September 1953, the question came up; this time worded, "The relative safety of Mercury Column Suction Gauges was brought up for discussion at our NAPRE Chapter meeting, because several members had heard or read about disastrous explosions attributed to such gauges. Any reliable information as to the cause and effect, and the chemical reaction created by the combination of mercury and ammonia or lubricating oil would be helpful to us." This question was answered by referring to the previous answer and then the added comment . . . "In addition, we should point out that all test codes recommend the use of mercury manometers for determining suction pressures."

Two months later, we received this additional contribution from an engineer in Washington, D. C. on the subject: "I called the head of the Chemists Division of the National Bureau of Standards and asked for an opinion on this subject. He advised me that he knew of no hazard whatsoever in operating equipment in which the mercury came in contact with liquid ammonia or gas. For thirty-odd years, I have used mercury columns for indicating ammonia evaporating pressures ranging from zero to 45 pounds gauge.



Left: Mercury manometer suction gauge in a cold storage plant at Chicago. One side of simulated U-tube is connected to ammonia suction lines by valves located at top of photo. Reading is 3 inches, vacuum (minus 32 F).

Right: Another view of the same instrument. Flat semi-cylindrical shape above ordinary room thermometer is the mercury reservoir. Note gauge line connections. Reading at this moment 3 inches (minus 31½ F).

On pressures operating below atmosphere, I have used a U-tube for indicating the minus pressures. To the best of my knowledge, there have never been any explosions of any kind in the plants in which this equipment was installed."

Then, following the NAPRE 1953 Convention came the following comment from Erik W. Holgren, Engineering Department, Abbotts Dairies, Inc.: "You might be interested to know that we have had such an explosion at our Ice Cream plant in Philadelphia in 1947. I am enclosing a reprint of the report of this explosion which appeared in the Chemical and Engineering News, American Chemical Society written by our chief chemist, Mr. John J. Sampey." Prof Venemann has since acquired permission to reprint the report, which follows:

Mercury and Ammonia — An Explosion Hazard

"An explosion of a mercury manometer in ammonia service occurred recently at

DIMCO CAST ALUMINUM FIN EVAPORATING COIL

★ Saves Space

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★ Saves Cost

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DETROIT ICE MACHINE COMPANY

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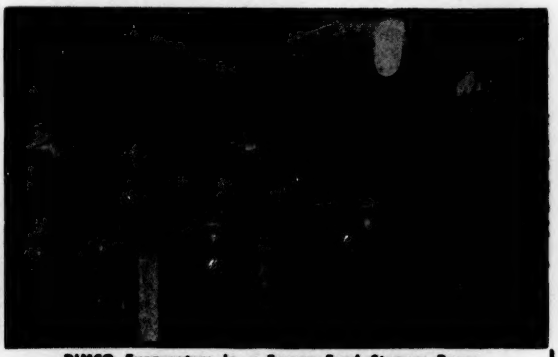


DIMCO Evaporators in a Frozen Food Storage Room at great Lakes Terminal Warehouse, Toledo, Ohio. A typical installation facilitating palletizing.

one of our plants in Philadelphia. Explosions involving manometers containing mercury in contact with ammonia have been reported in the past[1,2]; this recent accident serves to demonstrate further that a definite hazard exists in the use of mercury manometers in ammonia service.

"The manometer in use consisted of a glass tube open at the top to the atmosphere and connected at the bottom through a short steel "U" to a steel tube which in turn was connected to the vapor side of an ammonia refrigeration system. A length of steel rod and a wire had been inserted into the steel side of the manometer as a means of volume balance. Operating conditions were usually between 6 inches vacuum and 1 inch pressure. This instrument had been in use about 12 years and was cleaned annually. Although this had been done about a week prior to the accident, it had become partially plugged during this period and was removed for further cleaning. It was during this operation that the explosion occurred.

"The engineer, after removing the manometer and emptying the mercury, grasped the end of the steel rod and attempted to remove it by pulling and twisting. An explosion consisting of a sharp report accompanied by a bright flash resulted. The steel tube was shattered at about the point where the mercury level was usually located. About one inch of the tube, which had a wall thickness of 1/16 inch was fragmentized, with pieces scattering with considerable force over a wide area. Fortunately, the engineer was not injured seriously. The break in the tube was clean which indicates a detonation of high order.

"Subsequently, a small amount of gray-brown solid was removed from the steel tube and it was demonstrated that this was a violent explosive by heating a small quantity in a crucible. The detonation which resulted cleanly punched a hole in the bottom of the crucible. Following this preliminary test, the remainder of the material was submitted to Du Pont Co. for examination and analysis.

"The Du Pont laboratories reported that the composition of the material, free of metallic mercury, corresponded closely to intermediate dehydration products of Milon's Base[3], some of which are explosive.

"The presence of mercuric nitride, another explosive material, was not disproved, but the data seems to indicate that at least it is not the principal ingredient. The residue did not react with ammonium hexanitrato cerate solution, thus indicating the absence of azide groups.

"Data which have been accumulated, together with information from the literature, suggest that explosive material in the manometer residue consisted of one or more of the dehydration products of Millon's Base, and was formed directly or indirectly by the reaction of mercuric oxide with ammonia.

"The explosive material in the manometer residue was readily soluble in a sodium thiosulfate solution made by dissolving 1 lb. of sodium thiosulfate pentahydrate in one quart of water. This suggests a means which is probably safe for cleaning manometers in similar service. However, in view of what has been presented in the past, and in the light of this most recent occurrence, it is very evident that the use of mercury in contact with ammonia constitutes a definite explosion hazard."

The manometer pictured in Fig. 1 and 2 is in use in a cold storage plant in Chicago. As nearly as the Chief Engineer can estimate, it has been functioning since 1947. However, the foregoing report has this engineer and others worried. Shall the equipment be junked, and if so, what is the safest procedure to follow? Or shall it be retained and a safe cleaning schedule be set up? And what would be considered a safe method for cleaning?

In answer to your request for further information about the explosion hazards of manometers used to measure ammonia pressure in refrigeration plants, Prof. Venemann again contacted Purdue authorities who offered this opinion:

1. There is no reaction between mercury and ammonia under normal conditions.

2. Impurities in the ammonia may cause reactions to occur with the mercury which will lead to explosive materials.

3. To avoid explosions under circumstances described in (2) it is recommended:

(a) that chemical analytical control of the gases be installed with a competent chemist to investigate, or in the event of the impracticality of this

(b) to use manometers in which only glass or inert plastic comes in contact with the mercury, especially at the meniscus levels. It should be noted that the trouble occurred in the steel tube. Any impurities in the glass portion of the manometer could have been seen.

In the event that explosive compounds are formed they will almost undoubtedly float on the surface of the mercury and collect at or near the meniscus levels. Whenever such contamination becomes visible, the manometer should be removed and cleaned before dangerous amounts of explosive materials can collect. A suitable cleansing agent would be nitric acid or better, partially diluted nitric acid (for example 1:1 nitrict acid to water).

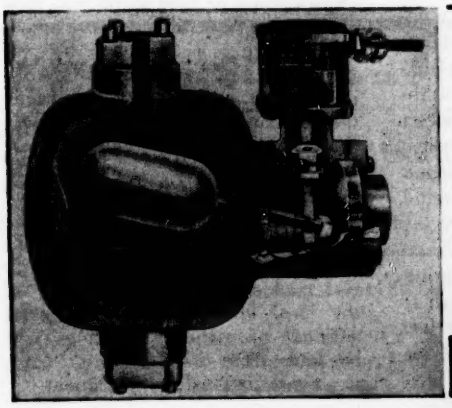
[1]Henderson, L. M., Ind. Eng. Chem., News Edition, 10, 73 (1932)

[2]Van Brunt, Science 65, 63-4 (1927)

[3]Comptes Rendus, 140, 853 (1905)

Refrigeration Unit Explodes

A REFRIGERATOR cooling unit exploded while being dismantled killing two East St. Louis men working on it. They were John Covington and Julius McKinney. The explosion occurred in a junk yard they operated at the rear of their home. Two small dogs lying nearby on the ground were unharmed. Police investigated a theory that a blow torch being used in the scrapping operation caused refrigerant gas to expand and explode the cooling unit.



the FLOAT SWITCH with the Picture Window

Mojonnier MS Float Switches have "Picture Window" sight glasses that provide an instant check on the refrigerant level, permitting fast trouble diagnosis, and often preventing costly "line check" shutdowns. Can be used on any accumulator or control, with any standard refrigerant. Switch operates on a new magnetic principle. All operating parts in transparent waterproof housing. Write for Bulletin 243. *Jobber inquiries welcomed.*

MOJONNIER BROS. CO., 4601 W. OHIO ST., CHICAGO 44, ILL.

MS FLOAT SWITCH

Machine Shop Uses Dry Ice to Shrink Parts

FOR more than 10 years The Falk Corporation, Milwaukee, has been employing dry ice for shrinking parts of machinery to produce a perfect fit. In the early days. This method was used mainly for driving of large threaded studs. Two inches or more in diameter into machine parts. This, in fact, was the original use made of dry ice in this company's machine shop and prompted the engineers to explore other applications such as those outlined below.

Dry Ice as Cooling Medium

For several years The Company has used dry ice as a cooling medium to increase the accuracy of gear and shaft assemblies, as dry ice, having a temperature of about minus 110 F, has been found to cool shafts to permit assembly with little or no pressing. Alcohol used with this process merely serves as a heat transfer medium since air is rather slow for this work. The results of this method of assembly at the Falk plant have been very good and dry ice is used extensively in the small and medium size units.

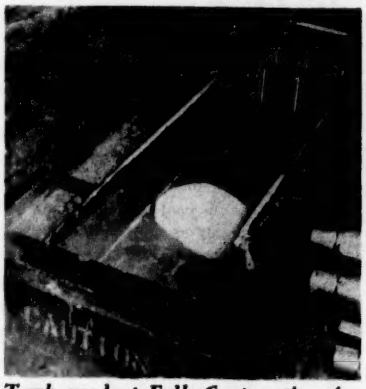
At present practically all motoreducer low speed assemblies, and speed reducer low speed assemblies up through No. 6 are assembled at the Falk plant by deep freezing, this including gears whose diameters range up to about 30 inches and shafts up to about four inches. The face runout of gears thus assembled is usually within .001 inch.

One reason for higher quality by deep freezing, according to the engineer on jobs of this kind, is the elimination of the danger of cocking the shaft on the bore. When assemblies are made by pressing only, the accuracy depends on very close control of the alignment between the shaft and the bore. However, the engineer has found, on a wide variety of work, this alignment is difficult to maintain. Deep freezing also eliminates gouging of shafts and bores of maximum interference within manufacturing tolerances when the shaft is at high limit and bore at low limit.

The same advantage, this engineer has found, can be gained by heating the gear blank, thus expanding the bore. However, heating must be uniform or highly localized stresses result, especially when heating with a flame. On some occasions both processes are combined, the shaft being cooled with dry ice and the blank heated with water.

Large Shaft Assembly

In 1953 two assemblies were made at the Falk plant which were more or less spectacular. One was a shaft 27 inches in diameter with a gear fit 48 inches long. This was cooled over a period of about 19 hours in 110 gallons of alcohol and 900 pounds of dry ice. The shaft was contracted .020 inches. A special tank built for this job was later used on a gear and shaft for a rolling mill drive. This shaft was approximately 20 inches in diameter with a gear fit 26 inches long. The 20 inches diameter contracted .016 inch at a temperature of minus 50 F.



Tank used at Falk Corporation for freezing machine parts with dry ice.

At this writing the Falk Corporation is considering freezing the shafts of one of the larger units, at least through No. 10. This, the engineer on the job thinks would involve shafts six inches and larger in diameter. Tests will be made within a short time to determine the effect of assembly by pressing and assembly by deep freezing on face runout.

The Falk Corporation has in mind installing a mechanical deep freezer for handling all of their deep freezing work, and capable of lowering the temperature to −150 F which is considerably below that of dry ice.

The construction of the dry ice tank is rather simple, the tank having a steel inner lining surrounded by sawdust and the whole incased in a wooden box with a hinged cover. Alcohol is generally used. The picture shows some of the shafts standing in the liquid and a cake of dry ice is seen floating on it at the near end of the tank.

Canadian Association Issues Cash and Carry Directory

THE Advertising Committee of the Canadian Ice Foundation announces that one of the most important projects this year will be the preparation and distribution of a "directory" of cash-and-carry stations throughout Canada. This folder titled "STOP for ICE" is now in the hands of the printer. It lists ice dealers' cash-and-carry depots or platforms and automatic ice vending locations throughout Canada and designates whether day-time or 24-hour service is available. These folders will be distributed to tourists, vacationers, picnickers, etc., through all first class motels across Canada, Government information bureaus, local tourist information bureaus which are usually operated by the Chamber of Commerce, oil company information bureaus, and at all ports of entry from the United States, as well as automobile association offices and through the manufacturers of ice chests.

Another vital advertising piece will be issued and copies mailed to ice dealers. This piece will promote 24-hour ice service (cash-and-carry) and will be used by ice dealers for distribution in the immediate area in which automatic ice vendors or platform service is available.

A special campaign is being prepared for the "Commercial" trades and advertisements will appear in the Canadian Grocer and National News which have a combined per issue circulation of more than 18,000 copies going to food stores and meat markets throughout Canada. The new channel icing method will be promoted as well as iced displays for meats, fish and poultry. Through the Canadian Hotel Review more than 7,000 restaurants, hotels, motels, bars, lounges and institutions will be reached with the ice industry messages.

Another project in hand is the preparation and production of a "direct mail campaign" to capitalize at the local level on all this general national promotion. Mailings will be made from the Association office to any designated establishment.

Basic Materials Exposition

MANY executives in the air conditioning, refrigeration, heating and plumbing industry are expected to attend the Basic Materials Exposition at the International Amphitheatre, Chicago, May 17-20. "The use of new materials for air conditioning, refrigeration, heating and plumbing supplies is growing so rapidly that it is virtually impossible for any executive to keep pace with developments," said Saul Poliak, president, Clapp & Poliak, Inc., producers of the show and concurrent conference.

Seventeen outstanding specialists will lead the conference discussions. One of the principal topics will be a discussion of the peacetime uses of materials developed for the special needs of rockets and guided missiles.

Among other topics of special interest to the air conditioning, refrigeration, heating and plumbing industry will be "Corrosion," "New Metal Forming Processes," "How, When and Where To Use Non-Metallic Materials," "Bonding of Metals and Plastics," and "How To Set Up a Materials Department."

The exhibits will emphasize the practical applications of materials, both new and conventional types. Only materials will be shown. Machinery manufacturers may attend as guests but may not exhibit.

Seattle Cold Storage To Continue Operating

THE Port of Seattle will continue to operate all its cold storage facilities at least through 1954 the Port Commissioners have announced. Proposals to shut down the Bell St. Terminal cold storage plant as stated in a recent issue of INDUSTRIAL REFRIGERATION, have been shelved.

After a thorough survey of cold storage at Bell St. and Spokane St. terminals and an overhaul of their operations, commissioners have given a new lease on life to the Bell St. cold storage plant. Recent economies, they say, promise to cut losses which a few months ago endangered continuation of the plant.

At that time, tenants protested that elimination of the 646,000 cubic feet of cold storage space at Bell St. might cost Seattle its hold on the mild-cured salmon industry. Tenants then discussed organizing a cooperative to administer Bell St.'s cold storage facilities. Private operators also have shown interest in both Spokane and Bell St. cold storage plants. However, those transactions have not jelled, and, after reviewing the situation, the Port Commission decided to carry on.

COMING CONVENTIONS

NATIONAL ASSOCIATION PRACTICAL REFRIGERATING ENGINEERS
November 2-4, 1954
Roosevelt Hotel, New Orleans, La.
J. RICHARD KELAHAN, Secretary

MOUNTAIN STATES ASSOCIATION OF ICE INDUSTRIES
May 14-15, 1954
Brown Palace Hotel, Denver, Colo.
J. REIMER ESPY, Secretary

OHIO SPECIAL ICE CANS

WELDED — RIVETED ICE CAN GRIDS

Industrial Trucks and Trailers

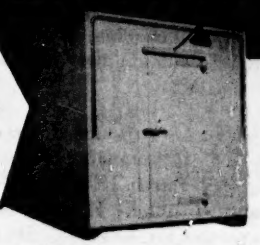
THE OHIO GALVANIZING & MFG. CO.
NILES OHIO

S&S ICE VENDING STATIONS and Ice Vending Equipment

AUTOMATIC! REFRIGERATED! DEPENDABLE!

S&S Frozen Food & Ice Cream STORAGE DEPOTS

For Independent, Outside Refrigerated Storage! . . . Complete Ready to Plug In! Portable!



Slash distribution costs . . . add frozen food profits for chain stores and super-markets!

Sold by Leading Ice Equipment Distributors Throughout the Nation

S&S VENDING MACHINE COMPANY
670 Lincoln Avenue San Jose, California

DEATHS

James E. Campbell

THE death of James E. Campbell, president and general manager of the Miners Ice & Fuel Co., Joplin, Mo. occurred March 17, in Research Hospital, Kansas City, Mo. He was 71. Mr. Campbell had been president of the Miners Ice and Fuel Company since 1932. He was one of the founders of The Missouri Ice Manufacturers Association and served as a Director for many years. He was a thirty-second degree Mason and a member of the Abou Ben Shrine temple at Springfield, Mo.

WALTER A. GILBERT, for many years owner and operator of The Walter Gilbert Ice Company, Dallas, Tex., died March 14. He was 60. Mr. Gilbert served in France during World War I and belonged to The Veterans of Foreign Wars.

RAYMOND L. WINKER, manager of the St. Clair Locker Plant, Belleville, Ill. died unexpectedly at St. Elizabeth's Hospital. He was stricken at the plant while at work and was moved to the hospital. He was 48.

WILLIAM KNEISLER, a branch manager for the Wisconsin Ice and Coal Company, Milwaukee, .Wisc., died March 28, after a short illness. He was 68. A native of Milwaukee, Mr. Kneisler had been with the old Gerling's Ice and Coal Company for 25 years before it was taken over by the Wisconsin Ice and Coal, several years ago. He was a member of the Bayview Chapter of the Odd Fellows.

JAMES M. LUCK, Ashland, Virginia, president of the Ashland Ice & Coal Company, and with other business interests, died March 11 at a Richmond hospital. He served several terms on the Ashland town council and was a member of the Ashland Kiwanis Club and the Masonic lodge. He was 68.

ADAM APP, owner of the Peoples Ice & Coal Company, Philadelphia, Pa., died March 18, at the Delaware County Hospital. Mr. App had been in business for 40 years. He was 80.

WALTER WYSOCKI, retired ice salesman for the Random Ice & Coal Co., Milwaukee, Wisc. died March 20. He was 74. He was born in Poland and came to Milwaukee when he was 21. He retired seven years ago.

GEO. W. MCCORMICK, assistant manager McCormick Rental Warehouses, Amarillo, Texas, was killed in an airplane crash north of Monterrey, Mexico late in March. James L. McCormick, owner of the Amarillo Enterprises, and father of Geo. W. was killed in the same crash, as were a brother and a nephew. All were returning from a fishing trip in Mexico. According to Chapter officers, Mr. McCormick joined the NAPRE in February, 1954. He was doing graduate work at the University of Chicago and was a frequent visitor to cold storage warehouses in the Chicago area in search of material for a thesis on refrigerated warehouse growth and advancement in the past 30 years. He had intended to enter the field in Texas later this year. His only survivor is his widow, now of Guthrie, Oklahoma.

FREDERICK W. HALLAM, Freeport, Long Island, New York, long active in the field of industrial refrigeration, died March 29 at the age of 78. Mr. Hallam was born in England and came to this country at an early age. In 1909 he founded the Hallam Engineer and Construction Company and was its first president.

LUTHER C. HANKS, retired refrigeration engineer, Oklahoma City, Okla. died at St. Anthonys hospital after suffering a heart attack. He was 60. He was a refrigeration engineer with Safeway Stores and then was with Standard Humpty-Dumpty Stores for six years until his retirement in January.

ROBERT C. LOONEY, Dallas, Texas, refrigeration engineer for the Service Ice Company, where he had been employed for 13 years, died in a Dallas hospital March 17. Mr. Looney came to Dallas in 1938.

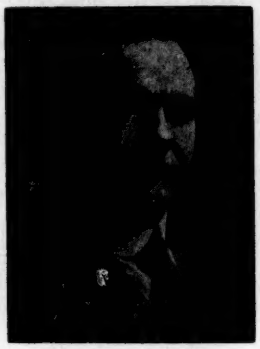
WILLIAM PARKER DAVIS, who had operated a mobile ice and coal business for over 30 years in Nashville, Tennessee, suffered a heart attack and died March 31. He was 70. Mr. Davis came to Nashville 55 years ago. He also operated a mobile grocery for the last six years.

Moscow-Peking Link

RADIO Moscow announced that an air-conditioned train, "equipped with vacuum cleaners" will inaugurate, direct rail service between Moscow and Peking, capital of China. The announcement stated that the train which will be used for this service was already waiting at Moscow station.

News of PEOPLE

CHARLES S. GILBERT, after 19 years as chief engineer for the Pfeiffer Brewing Company, Detroit, Mich., retired from that position as of March 31. Mr. Gilbert formerly was an active member of the Chicago Chapter NAPRE and is a life member of the ASRE. Mr. Gilbert became a charter member of Chicago



Charles S. Gilbert
Detroit, Mich.

Chapter, NAPRE in 1920. In 1927, with George B. Bright he helped organize the Midwest Engineering, Company, Chicago. In 1933 he sold his interests in that concern and went with what is now Drewry's Brewing Company, South Bend, Ind. In 1935 he joined the engineering staff of Pfeiffer's Brewery, Detroit.

ALBERT B. DRAKE, formerly with the Lehigh Warehouse & Transfer Company, Newark, N.J. who retired some years ago has been appointed Director of the Office of Storage, Distribution and Disposal of the Department of Defense. Mr. Drake is well known in the warehousing industry and formerly was active in the American Warehousemen's Association. He also has been appointed a member of the Hoover Commission on Organization of the Executive Branch of the U. S. Government.

VALLEE O. APPEL, Fulton Market Cold Storage Company, Chicago has been appointed to membership on the Hoover Commission on Organization of the Executive Branch of the U. S. Government, as a member of the Task Force Committee on Foods.

A. J. DEFINO, vice-president of the Fedders-Quigan Corp., Buffalo, N.Y. has been elected president of the Air Conditioning and Refrigeration Institute. He succeeds L. C. McKesson, vice-president in charge of sales of the Ansul Chemical Company, Marinette, Wisc.

MANUFACTURERS' NEWS

Lewis R. Smith Rejoins Acme

AN announcement by P. A. Weatherwax, Acme Vice-president states that Lewis R. Smith has rejoined the Engineering staff of Acme Industries, Inc., Jackson, Mich., Manufacturers of Air Conditioning and Refrigeration Equipment, where he will administer and direct a progressive

Lewis R. Smith

research and development program, and act in an advisory capacity to the sales and engineering sections. During his previous tour of duty with Acme, 1936 to 1944, Mr. Smith was a prime factor in the development of such well-known Acme products as the Dry-Ex Chiller, J and STF Series Freon Condensers, Evaporative Coolers and Condensers and Heat Exchangers.

He recently resigned from the Remington Corporation of Auburn, N. Y., to take his new position at Acme. At Remington he was active in the development of various room air conditioners and served on the Engineering Committee of the Room Air Conditioning Section of A.R.I.

York Announces New Stock

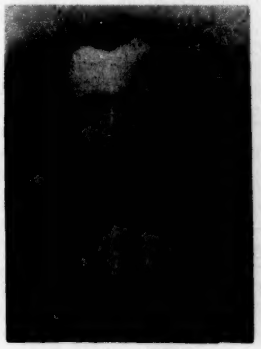
THE York Corp. has registered with the Securities and Exchange Commission a proposed offering of $18 million debentures and 220,000 shares of common stock. Proceeds estimated at approximately $23 million will be used to retire certain bonds and notes and for working capital. First Boston Corp. and Kidder, Peabody & Co. will head the underwriting groups.

Cyrus Shank Company Moves

THE Cyrus Shank Company, manufacturers of Refrigeration Valves, it is announced by Frank Krupp is moving to larger space at 4646 West 12th Place, Chicago 50, Ill.

Watt Heads New Section For Worthington

FRED J. WATT has been named manager of a newly combined section of Worthington Corporation's Air Conditioning and Refrigeration Division at the Corporation's Harrison, N.J., executive offices,



Fred J. Watt

M. M. Lawler, Vice President, has announced. Mr. Watt assumed his new duties effective April 1 as head of the new section known as the central station and ammonia equipment section. The new section is a combination of the ammonia equipment section and the central station equipment section.

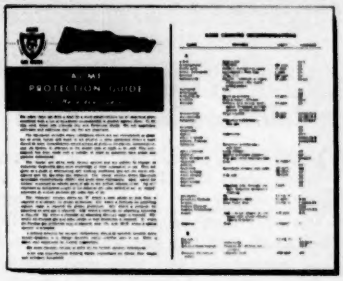
Gaddy New Representative Index Coupon & Supply

THE appointment of William (Tex) Gaddy as representative covering the states of Florida, Georgia and Alabama on an exclusive basis effective April 1, is

William (Tex) Gaddy

announced by The Index Coupon & Supply Co., LaPorte, Ind. Mr. Gaddy has lived and traveled in the south for many years and will temporarily make his home in Montgomery, Alabama, where his wife's parents reside.

DO YOU HAVE A GAS HAZARD?



New ACME PROTECTION GUIDE lists 433 gases, mists, fumes and dusts and gives specific protection information

If you have any hazardous condition involving gases, mists, fumes or dusts, it will pay you to get a copy of Acme's new Protection Guide. Here, in one handy reference folder, is a most comprehensive list of trouble sources including pertinent data, limits, and the Acme canisters designed to give you dependable protection for each specific hazard.

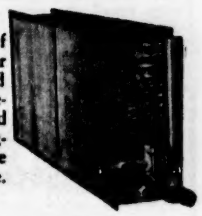
Write today for your free copy of the ACME PROTECTION GUIDE.

Acme Protection Equipment Co.

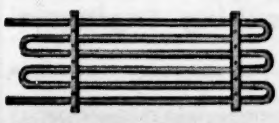
Manufacturers of Acme Full-Vision Gas Masks
3037 West Lake Street
Chicago 12, Illinois

HEAT TRANSFER EQUIPMENT
REMPE CO.
Founded 1890

PIPE COILS—FIN COILS
FOR REFRIGERATION, AIR CONDITIONING, HEATING



Coils and Bends of any Metal, Size or Design. Engineered to your requirements. Designed and built for longest life and the least maintenance.



Send your problems to us for engineering assistance.

REMPE COMPANY
348 N. Sacramento Blvd., Chicago 12, Ill.

CATALOGS AND BULLETINS

Bulletin on Maintenance of Calcium Chloride Brine

OPERATING conditions of a refrigerating plant can often be improved by regular checks of brine and prompt corrections when necessary. Brief RB-1 "Maintenance of Calcium Chloride Brine" gives suggestions for accurately testing brine strength and tips for strengthening brine. It includes data on tests for ammonia leakage, alkalinity or acidity of brine, corrosion inhibitors, and methods for correcting acidity and alkalinity. A handy chart indicates proper amounts of calcium chloride needed in preparing or strengthening brine. A copy of Brief RB-1, is available from Calcium Chloride Institute, 909 Ring Building, Washington 6, D. C.

Freon Refrigerant For Low Temperature

A PRESS release from the Du Pont Company on "Freon-13", monochlorotrifluoromethane, describes it as a nonflammable and nonexplosive refrigerant designed for systems producing temperatures in the range of minus 70 to minus 150 F., now finding wider application in many types of metal treatment, chemical processing, and testing work.

Supplies of the refrigerant, which may simplify the design of equipment for low-temperature work and eliminate the use of flammable and explosive refrigerants, will be stocked at the company's warehouses at Carney's Point, N. J., and East Chicago, Ind. It will be available in 5-, 9-, 23-, and 80-pound cylinders.

Big advantage of 'Freon-13" is its adaptability to use in compact, economical hermetic-type compressors in very low temperature applications. Early equipment for cooling to minus 150 F used ethylene or ethane, both of which are flammable and explosive and required more expensive and space-consuming "open type" equipment.

The chemical stability of "Freon-13" and the fact it is non-corrosive with metals and other components of conventional refrigeration equipment make its use in existing equipment relatively simple, says the release. Compressors designed for use of "Freon-12" have been adapted to "Freon-13", with the "Freon-13" requiring approximately the same compressor displacement at minus 100 F as is required for "Freon-12" at 0 F.

Sizes from fractional horsepower installations up to 50 tons capacity are being produced with reciprocating compressors for temperatures of minus 70 to minus 125 F. Certain installationa, by two-staging the "Freon-13" and cascading the high stage with "Freon-22" are producing temperatures lower than minus 150 F.

Folder on Lubrication

DR. "E", the Dry Film Lubrication expert of Electrofilm, Inc., now has available a new file folder with his latest and most complete answers for the solution of difficult lubrication problems due to extreme heat, excessive cold, inaccessibility, high speeds, high loads, galling, seizing and excessive wear. In many cases he has found that Electrofilm dry film lubricants solve problems where other lubricants fail. This complete file folder is free to all those who are faced with lubrication problems. Write to Dr. "E", Electrofilm, Inc., P. O. Box 106, North Hollywood, Calif.

Bulletin on Pressure Gage Pneumatic Transmitter

THE Penn Pressure Gage-Pneumatic Transmitter is fully described in recently published Bulletin 1025 issued by The Penn Industrial Instrument Corp., Philadelphia, Pa. Among transmitter advantages listed are safety features, low maintenance, simplicity of design and function. Combination gage and transmitter is particularly suited for remote indications or recording in hazardous locations where it is desirable to avoid electricity. Close-up photos illustrate transmitter mechanism showing back and front view. Full data given on capacities, pressures, materials of construction as well as operating details. A separate section includes photographic illustrations of variations in types of receivers used. Also line drawing with dimensions and suggested installation methods.

New Bulletin Describes Refrigerant Controls

A NEW bulletin issued by The Partlow Corporation of New Hartford, N. Y., gives specifications and engineering details on the complete line of Partlow refrigeration controls. This two-color, four-page bulletin, No. 109 describes the application of mercury-bulb instrumentation down to minus 30 F. All Partlow controls are based on the time tested mercury-bulb principle, which accounts for their rugged but sensitive characteristics. The range of the Partlow instruments covered in this bulletin (from 120 F down to minus 30 F) covers all normal conditions met today in meat packing, food processing, petro-chemistry, transportation of perishables, pharmaceutical production, air conditioning, baking, candy making and scores of special industrial processes. Anywhere in that range, sensitivities of plus or minus 1½ degrees can be assured. It covers recording, indicating, or non-indicating instruments in the low temperature range. Application, operation, and special features are described, with a specially developed table simplifying the ordering of any instrument.

Bulletin Describes New Dock Ramp

A NEW bulletin issued by Rowe Methods Inc. Cleveland, Ohio describes Adjust-A-Dock, Model No. 20, which is a 20,000 pound capacity, non-floating hydraulic adjustable ramp. This model, specifically engineered to make fast bridge connection between a loading platform and bed of highway truck is raised or lowered to suit requirements of each job by means of instant-acting push button controls. Subsequent adjustments may be made with the rated load on deck, using the ramp's heavy-duty hydraulic power system. When not in use the ramp is positioned flush with the platform floor to permit normal cross traffic.

FRED OPHULS & ASSOCIATES

Consulting Engineers

112-114 West 42nd St. New York City 36

Ice Making and Refrigeration
Industrial Power Plants
Reports, Appraisals and Management

VAN · RENSSELAER H. GREENE

ENGINEERS

COMPLETE PLANT DESIGNS INCLUDING BUILDING AND EQUIPMENT

11 PARK PLACE NEW YORK 7, N. Y.

Zimmermann Engineering

Air Conditioning — Heating — Ventilating — Plumbing
Electric — Refrigeration

Industrial — Commercial — Domestic
Designs — Evaluations — Specifications — Legal: Inspections, Reports, Testimony

500 - 5th Avenue, New York 36, N. Y.
LOngacre 3-5965-6

A. Urban Zimmermann
Consulting Engr.

New Standards of Butter Grades Announced

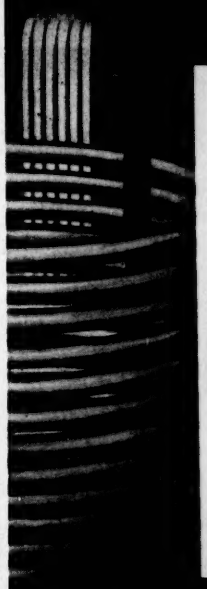
THE U. S. Department of Agriculture has announced revised proposed standards for grades of butter to supersede "Official U. S. Standards for Grades of Creamery Butter" that have been in effect since February 1, 1943. A change in the 1943 standards was first proposed in 1952. The views of interested groups have now been received and based on those views, the revised standards are again issued as proposed standards.

In view of the fact that a new marketing year for the dairy price support program begins on April 1, the Department expected to make the new standards effective on April 1, so as to eliminate the confusion of change of standards after the new price support program has been placed in operation.

The proposed revised standards would provide the Department with improved butter standards for use in its voluntary inspection and grading service and would make available to the butter industry improved standards for use in buying and selling butter on a quality basis.

The revised standards are substantially the same as those proposed in 1952 except that both letter and numerical grade nomenclature of U.S. Grade AA or U.S. 93 Score, U.S. Grade A or U.S. 92 Score, U.S. Grade B or U.S. 90 Score, and U.S. Grade C or U.S. 89 Score would be used. (Both the letter and numerical nomenclature are part of the 1943 standards. In 1952 it was proposed to drop the numerical designation). The revised proposal would permit the flavor of wild onion or garlic to a slight degree in Grade C or 89 Score butter. The flavor of neutralizer would be changed from "definite" to "slight" for Grade B or 90 Score butter.

PIPE BENDING EXPERTS



Our skilled metalworkers can build from your exact specifications

COILS, HEADERS, PIPE BENDS. . .

in any form, of any metal, including stainless steel. Complete welding facilities. More than 35 years of specialization assures you fine quality custom work. We invite your inquiry.

On your next job, permit us to quote our price.

CHICAGO NIPPLE MFG. CO.

1997 CLYBOURN AVE., CHICAGO 14, ILL.

Classified Advertising

All classified advertisements are payable in advance. Except for Positions and Help Wanted classifications, this section is reserved exclusively for USED equipment.

RATES: 20c per word; minimum 25 words. $2.00 per line for bold face headings. $15.00 per inch for line listings.

ICE PLANTS—for sale

FOR SALE—COMPLETE ICE PLANTS
20 tons to 150 tons.
AMMONIA COMPRESSORS
12½x14½ York—175 h.p. syn. motor.
10x10 York—100 h.p. synchronous motor.
9x9 York—175 h.p. synchronous motor.
9x9 Frick—V belt drive 300 r.p.m.
7½x7½ & 6½x6½ York Model D-8 high speed. 4x4 self-contained unit.

MISCELLANEOUS EQUIPMENT
130 h.p. Diesel engine. 60 & 75 h.p. slow speed motors. G.W. breaker el. unit. Brine coolers, ice cans, blowers, etc.
JOHN F. CARSON
"A" & Venango Sts. Philadelphia 34, Pa.
Phone GArfield 6-2221

USED EQUIPMENT—wanted & for sale

WANTED—One used shell and tube condenser of 125 ton capacity; one 36" to 42"-16'-0 liquid receiver. Address Box MY-2, c/o Industrial Refrigeration, 435 N. Waller Ave., Chicago 44, Ill.

FOR SALE—2 used 1,000 lb. electric hoists, one with track and beams; 1 used electric tier stacker; 1 used brine agitatator with motor. Used electric motors 7½, 10, 25 h.p., 3 phase, 60 cycle, 220 volt; also several hundred double can tops. Wilson Fly, P.O. Box 5506, Memphis, Tenn., or phone 36-6313.

FOR SALE—Vertical brine agitator with 3 h.p. motor, $50.00. Brine records, Taylor, $25.00. Double can filler, $25.00. Cake dump, $25.00. Surge tanks shell and tube condensers, receivers, ice cans 300 lbs. 11x22x50-14 gauge, $5.00 each. 9x9 Frick with 75 h.p. synchronous motor. 12x24 duplex horizontal twin cylinder force lubrication connected to 250 h.p. synchronous. Gordon Equipment Co., 6530 W. Jefferson Ave., Detroit 17, Mich.

FOR SALE—York 9x9 with or without synchronous motor, with grooved flywheel; Vilter 9½x9½ and 10½x10½ with grooved wheels; 9x9 Frick with motor; 9x9 York slow speed. Cranes, can fillers, condensers, brine coolers, raw water equipment, cans, agitators, blowers. 15 ton ice plant. Parke Pettegrew, 370 West Broad St., Columbus 8, Ohio.

FOR SALE—10"x7" Worthington booster compressor. 5x5, 7½x7½, 8x8 and 9x9 Yorks splash lubrication. 3x3 self-contained York. Write E. Niebling, 1546 St. Clair Ave., Mt. Healthy, Cincinnati 31, Ohio.

FOR SALE—One Flynn & Emrich size 50 ice cuber and one Flynn & Emrich large size fully automatic ice cuber, Type 300-S. Both used machines, but in excellent operating condition. The Hill Mfg. Co., 380 Lexington Ave., New York 17, N. Y.

FOR SALE—Complete Baker and Lipman 20-ton Ammonia Refrigeration Systems; compressors, motors, electric controls, lowsides. Best offer for prompt disposal. Landquist & Son, 431 N. Wolcott Ave., Chicago 22, Ill.

FOR SALE

USED ICE PLANTS AND REFRIGERATING EQUIPMENT

20 ton Ice Plant 240—300 lb. Ice Cans—4 Can Pull—Electric Driven
50 ton Ice Plant 616—300 lb. Ice Cans—7 Can Pull—Electric Driven
85 ton Ice Plant 1040—300 lb. Ice Cans—26 Can Pull—Diesel Driven

AMMONIA COMPRESSORS

6x6 York Y-26 — 6x6 York Y-28
6½x6½ York Y-28 — 6½x6½ York Y-38
7x7 Frick type H — 7½x7½ York Y-15
8x8 York Y-26 — 8x8 York Y-28
10x10 York Y-28 — 12½x14½ York Y-26
9x9 Frick type H capacity control D.C. 100 HP 360 RPM Syn. Motor
9x9 York Y-28 capacity control D.C. 100 HP 300 RPM Syn. Motor
10x10 York Y-16 D.C. 100 HP 200 RPM Syn. Motor
10x10 York Y-16 D.C. 70 HP 180 RPM Syn. Motor
10x10 York Y-28 D.C. 100 HP 300 RPM Syn. Motor

ICE CANS

700 11x22x47" 300# Excellent Condition
100 11x22x51" 300# Excellent Condition
1000 11½x22½x44" 300# Good Condition
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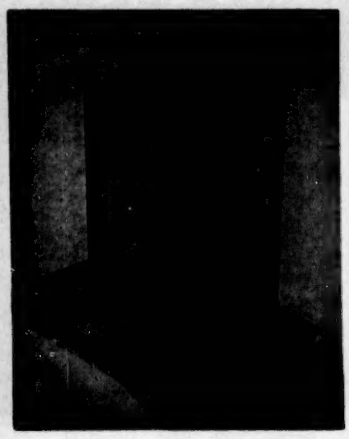

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29 Chapters—340 ILLUSTRATIONS

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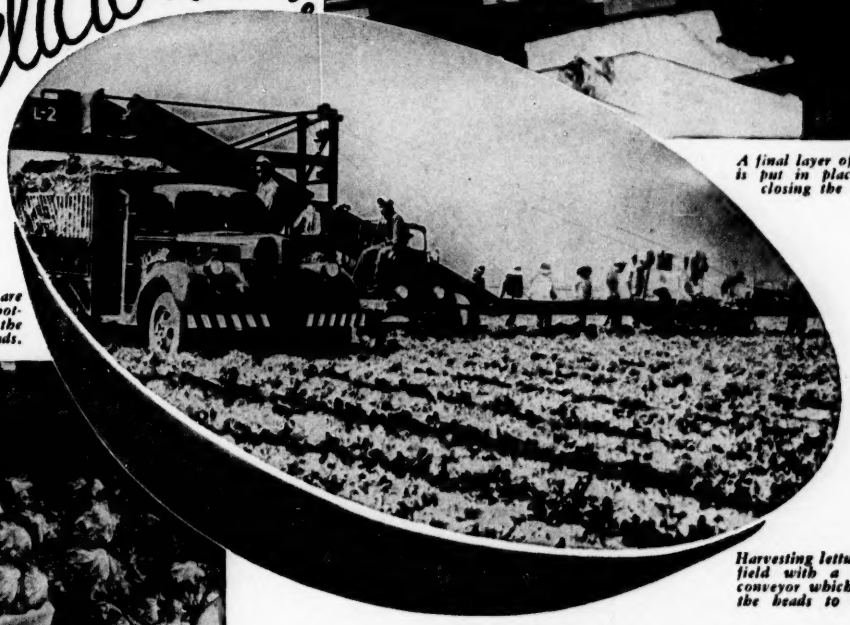
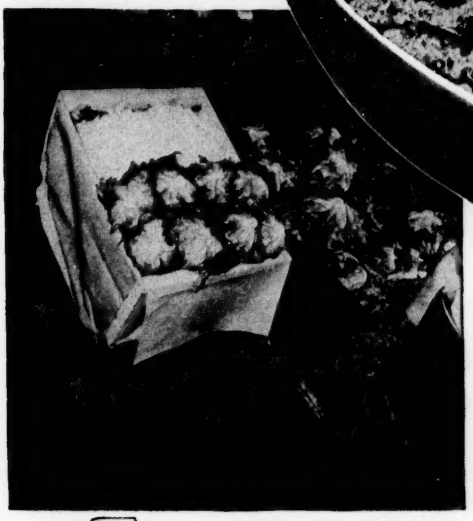
Delivered Delicious...

A final layer of Vogtice is put in place before closing the crate.



Layers of Vogtice are placed on the crate bottom and between the courses of lettuce heads.

Harvesting lettuce in the field with a traveling conveyor which delivers the heads to a truck.

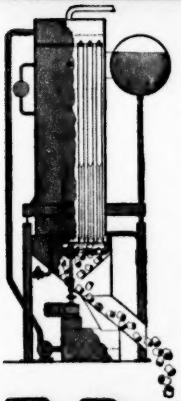


...straight from the Nation's "Salad Bowl"

Head lettuce from the Salinas Valley, California "Salad Bowl" graces the tables in American homes from coast to coast. In the season, shipments will average 135 refrigerator cars daily.

The J. J. Crosetti Packing Co. with headquarters at Watsonville, California is one of the largest growers and packers and operates a battery of four Vogt Automatic Tube-Ice Machines to provide Vogtice for carload shipments. The crates of iced lettuce are loaded in refrigerator cars and then a protective blanket of Vogtice is blown over them to retain freshness and crispness for distant markets.

Vogtice is playing an increasingly important role in the cooling, processing and preservation of foods and beverages. Our new Bulletin TI-3 gives the general information and will be sent upon request.



HOW THE TUBE-ICE MACHINE FUNCTIONS

In making ice, water is pumped to the top of the freezer and flows downward along the inside walls of tubes into a water tank. Refrigerant in shell surrounds tubes and freezes water into cylinders of ice. An automatic timing mechanism operates suitable valves to control all functions of the machine. Ice is freed from the tubes by thawing when the refrigerant is displaced by high pressure warm gas from the compressor.

Employing direct application of the refrigerant, all expense incidental to other systems is eliminated.

Patent Numbers 2,200,424, 2,230,234, 2,306,308, 2,444,514, 2,453,148.

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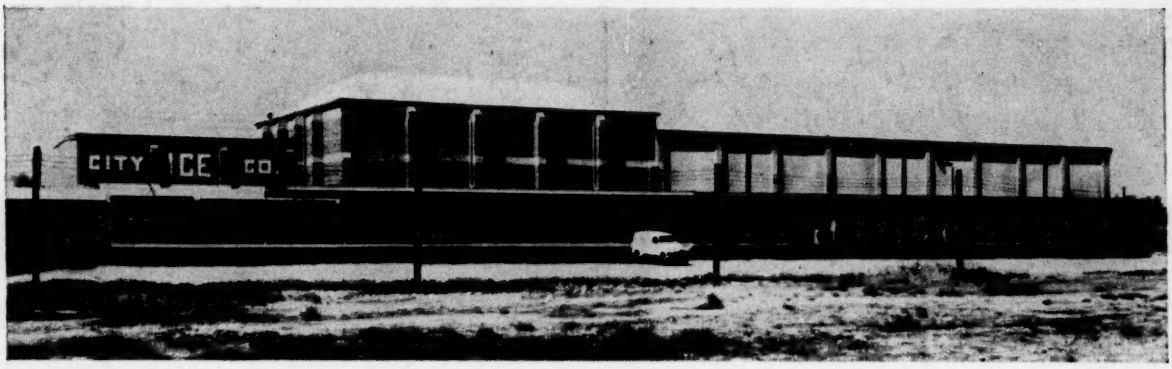
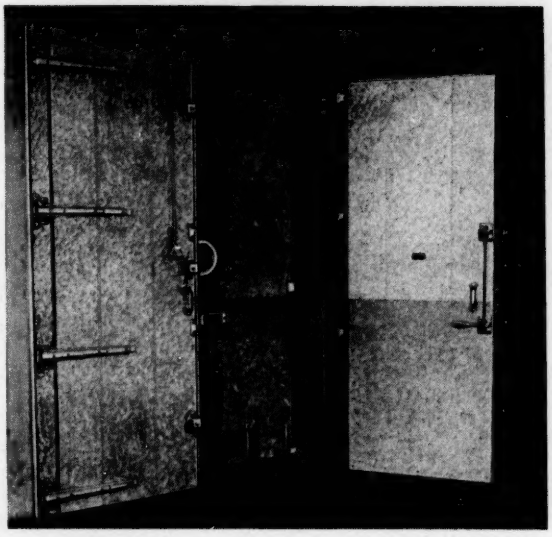
Vogt *Automatic* TUBE-ICE MACHINE



Modern Ideas in CITY ICE COMPANY Warehouse Include JAMISON Lo-Temp Doors

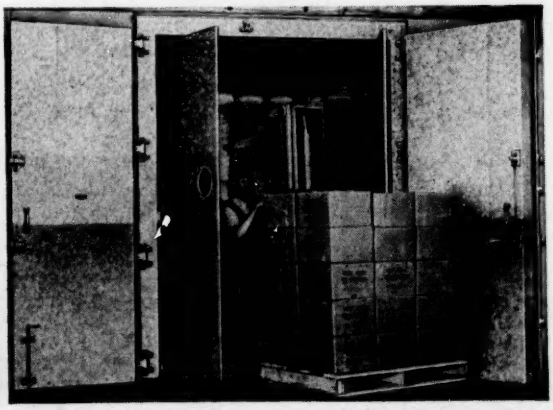


Light In Weight, Lo-Temp Doors are easy to open or close. Metal cladding, combined with the kick plates on the back, adds further to the strength of the doors and enables them to withstand constant battering.

Efficiency typifies the modern City Ice Company warehouse in Denver. It's evident in the latest tip-up type of wall construction . . . and in the three Lo-Temp Double Vestibule Doors which are used for frozen food storage at —15° to —20°F.

Opening off the loading dock, these metal-clad infitting doors maintain a tight seal and provide ample insulation no matter what the outside temperature. Because of their large size, the doors also speed handling by giving lots of clearance for loaded fork lift trucks. An extra set of Auto-Close Doors forms an air lock behind the Double Vestibule Doors to minimize cold loss during handling.

For additional information about cooler or freezer doors, consult your architect or write to Jamison Cold Storage Door Company, Hagerstown, Maryland, U.S.A.



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More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.